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NEWSPAPER

CW Photo by R. Frank

Gregory Friedman (right), IBM product manager, demonstrates Series/1 CRT operating with ITS software at the recent National Computer Conference. The terminal was connected to a 370/168 in Boca Raton, Fla., operating under MVS and TSO. A 370/148 operating under VM/370 in Dallas, the site of the conference, was also used for the demonstration.

IBM Subsystem Allows Series/1 To Emulate 3270 Terminals

By Ronald A. Frank
Of the CW Staff

ATLANTA — IBM has introduced teleprocessing software for the Series/1 which allows the minicomputer and its attached CRT terminals to operate in 3270 emulation mode with 370 mainframes.

The Series/1 Intelligent Terminal Subsystem (ITS) allows the 4978 and 4979 display terminals to emulate "most of the functions of an IBM 3277 display station," according to the company.

The ITS allows communications with 370 mainframes using 3270 protocol over binary synchronous communications (BSC) lines. The Field Developed Program (FDP) will support attachment of eight 4978 or 4979 displays in any combination, one 4974 printer and two Binary Synchronous Communications (BSC) lines, the company said.

The FDP is supplied in source and object form code and the user is required to alter the source code to the terminal and line configuration required. Additional assembling is required if user-written application code is to be added, IBM said.

Documentation is supplied to enable the user to allow for configuration differences, terminal changes and user application code. Documentation is also included in the ITS to instruct the user on adding terminals and BSC lines.

Program interfaces are defined to allow user-written conversion routines to support other terminal types including display and teleprinter units, IBM said.

After initialization, the 4979 user gets a

(Continued on Page 2)

Study Finds Salaries Now at All-Time High

NEW YORK — Salaries for DP personnel are at an all-time record high, according to a survey by Robert Half Personnel Agencies, Inc.

Salaries for programmers with more than one year of experience, for instance, have climbed as much as 11.5% over last year.

In a large installation, a beginning programmer can now command a salary in the $12,000 to $14,500 range, a 1.9% increase over a year ago, while an operator's salary increased 6.7% from $10,000 to $14,000, the survey reported.

Salaries for data base administrators (DBA) are up 2.3%, ranging from $20,000 to $25,000. These parallel gains for DP auditors. DP managers in large installations saw a 4.8% gain in wages.

In medium-sized installations, salaries are

(Continued on Page 2)

Davis Suggests NBS Institute Will Be Reorganized, Resituated

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Dr. Ruth M. Davis "won't deny" there is activity underway to take the Institute for Computer Sciences and Technology out of the National Bureau of Standards (NBS).

Contrary to recent rumors here that the institute would be placed somewhere in the bowels of the Department of Commerce, of which NBS is a part, the outgoing institute director suggested the unit is more likely to be reorganized in a position closer to the head — somewhere near Secretary of Commerce Juanita Kreps' office.

There have been three previous attempts to remove the institute from NBS, combine it with Commerce's Office of Telecommunications and the White House's Office of Telecommunications Policy and have the amalgam report to the Assistant Secretary for Science and Technology in the Department of Commerce, she said.

Again, Davis wouldn't deny a similar proposal is being considered at the Office of Management and Budget (OMB) now.

Davis, who expects to leave the institute for a post at the Department of Defense (DOD) at the end of June [CW, May 30], indicated the motivation behind such a reorganization is the governmentwide nature of the program sponsored by the institute.

It would be appropriate to elevate the role of the institute to a policy-making level and to combine computers, communications and information organizations into one body under an assistant secretary, she added.

When Davis first arrived at NBS nearly six and one-half years ago, the organization she was to lead was known as the Center of Computer Sciences and Technology.

Under her leadership, the center became one of the four major institutes at NBS, re-

(Continued on Page 4)

Justice Department Hedges On FBI Switching Plan OK

By Nancy French
Of the CW Staff

WASHINGTON, D.C. — The Carter Administration has retreated from its endorsement of the controversial message-switching system proposed by the Federal Bureau of Investigation (FBI) because of a barrage of criticism from Congress.

The system — rejected by President Ford on grounds it would threaten civil liberties but approved by the present Administration two weeks ago — was called the start of "a national police state" by members of Congress.

The computerized switching system would funnel National Crime Information Center (NCIC)-related administrative messages to and from the nation's local and state law enforcement units through a computer operated by the FBI. The system was approved by Attorney General Griffin B. Bell's Deputy Attorney General Peter F. Flaherty, former Pittsburgh Chief of Police, who has since backed off from his endorsement.

"We are reexamining the authorization. We don't want to violate anyone's civil liberties," he said.

In a May 19 memorandum to FBI Director Clarence Kelley, Flaherty authorized the system ostensibly to enable Alaska, Hawaii, Puerto Rico and Canada to send messages to states within the contiguous U.S. However, the memorandum also invited use of the switching system "wherever it is economically attractive," opening the door to any state that chooses to use the system.

The system would also enable certain federal agencies to send messages to state police units via the National Law Enforcement Telecommunications System (Nlets) — a nonprofit consortium funded and operated by the states.

No CCH Switching?

Flaherty emphasized in his May 19 memorandum that the system "should not be construed as allowing the switching of Computerized Criminal Histories" (CCH) maintained by the NCIC.

Under the present plan, the system would not be used for free-form administrative messages between the state law enforcement agencies; they would continue to be handled by Nlets, sources said.

But critics fear the FBI system could replace the service now provided by Nlets since it will be offered free of charge. Nlets costs state users a minimum of $800 per month.

Further, since most of the criminal histories are still maintained by the states rather than the FBI, Flaherty's prohibition against transmitting CCH records over the network would not necessarily mean very much, sources said.

If the states opt to abandon Nlets in favor of the free service, the FBI would then have total control over messages between state and local law enforcement agencies, which would enable it to monitor and virtually control local law enforcement operations, they contend.

This could bring about a de facto national police force — a concept many policymakers see as threatening the basic freedoms guaranteed by the U.S. Constitution.

The message-switching system, which has been considered in various configurations since 1973, has been strongly criticized by congressional leaders, including former Sen. Sam Ervin (D-N.C.), former Sen. John Tunney (R-Calif.) and two representatives, California Democrats John E. Moss and Don Edwards.

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CDC Fears Loss of Customers From Testimony at IBM Trial

By Catherine Arnst
Of the CW Staff

NEW YORK — As a result of his testimony against IBM, a witness at the U.S. vs. IBM antitrust trial indicated his company — Control Data Corp. — would probably lose customers and had already felt repercussions.

"We'll be wearing a black hat after my testimony," Gordon Brown, senior vice-president of marketing and planning, said of his firm.

He added that CDC was already in trouble with Sollac, a French firm, as the result of a Telex message introduced in court during Brown's testimony. The Telex, sent in May from CDC's French representative, said IBM had preannounced an enhanced 3350 disk drive to the DP manager of Sollac.

As a result of the preannouncement, Sollac was reconsidering the purchase of CDC 33801 disk drives it had planned, Brown said. He then told the court he had received a phone call the morning he testified on the matter, informing him IBM representatives had visited Sollac concerning the Telex used in court.

The IBM representatives told Sollac the preannouncement information was given in confidence and should not have been made public. There was an inference by Sollac that it would be brought into the court proceedings as a result, Brown said.

"The customer was upset and said it was

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Uses OCR Techniques

Facsimile System Feeds Into Mainframes

By Ronald A. Frank
Of the CW Staff

CHICAGO — Stewart-Warner Datafax Corp. has introduced a facsimile system that it said is compatible with "conventional DP systems" and allows digitized information to be entered into a CPU. The Datafax Dimension system includes a charge-coupled device (CCD) scanner, a microprocessor and a facsimile unit, as well as optional scanning technologies.

While this combination does not represent new technologies, the manner in which the devices have been combined will allow digitized facsimile information to be entered into mainframes such as IBM 370s, according to a spokesman.

Once data has been entered into a CPU, it can be output either on conventional DP peripherals such as printers or on CRTs and transmitted to a remote facsimile unit.

The Dimension system is customized and intended for larger users who want to establish a network of 50 or more systems. The customization is necessary because an interface has to be configured to allow facsimile transmissions between the Dimension and the user's mainframe.

The basic system can be set up to read two typewriter fonts such as Courier or Letter Gothic. Other fonts can be built into the system as part of the customization effort, the spokesman said.

Using optical character recognition (OCR) techniques, the fonts are scanned and translated into Ascii characters for transmission over data communications facilities. Both analog and digital lines can be used with the Dimension system, but modems are not included and must be obtained by the user, the vendor noted.

Transmission can range from 150 char./sec up to wideband 1M bit/sec streams depending on the volume of traffic on the user's network and the lines available, according to the spokesman.

In tests without the microprocessor, the system transmitted one page in 45 sec; on a 50 kbit/sec wideband link over a 1 Mhz channel, it took 6 sec to transmit a page. A normal page is defined as 300 words or 12,000 bits of intelligence.

The maximum speed of the transmitter is 2 sec/page, the spokesman claimed. This represents a transmission rate of 1M bit/sec. The microprocessor is required as a buffer because the recorder is limited to 6 sec/page.

The recommended 50 kbit/sec channel can be reduced with the use of data compression techniques, he noted. Compressed data can be transmitted over voice- and TWX-grade lines without problems, he added.

If the information is all "Ascii-convertible," a 300-word letter can be transmitted on a 1,200 bit/sec line in 10 sec with data compressing. On a 2,400 bit/sec line, this data would be transmitted in 6 sec, also with data compression, he said.

The Dimension system can be interfaced through the microprocessor with "any CPU" regardless of protocols being used, the spokesman claimed. One of the first users has a large IBM network with 370s and field testing is now going on, according to the spokesman.

Compatible software will be provided in the microprocessor for the required interfacing. First public demonstrations of the system are scheduled for the fall and first deliveries are slated for early 1978.

Prices for the system will range from $11,000 to about $13,000 depending on the complexity, transmission speed and customizing required. One-year maintenance contracts will be extra.

Each end of a link would incude a transmitter for $2,500 to $3,000; a recorder for $3,500 to $4,000; and the microprocessor for $4,500 to $6,000.

Stewart-Warner Datafax Corp. is at 1300 N. Kostner Ave., Chicago, Ill. 60651.

Teleprocessing Software Lets IBM Minis Emulate 3270s

(Continued from Page 1)

"menu" of selectable functions and lines on the CRT screen, keys in the commands for connection to the host CPU and then operates in the same manner as with a 3277 terminal, the firm added.

Command codes are used in place of function keys. The 4978 user has function keys that allow usage similar to the 3277. Support on the 4978 includes user-invoked save and restore of local key reassignment.

In addition, a user of the minicomputer substation CRT terminals can establish an interactive session with one or two remote 370 hosts while remaining in a local mode to the Series/1 system, according to a spokesman for the General Systems Division.

The Series/1 ITS emulates the 3271 Model 2 control unit, the 3277 Model 2 CRT and the 3286 printer providing screen image printouts.

The 3271 features allow emulation of one or more control units concurrently; enables users to have sessions with multiple host CPUs concurrently; gives the user access to several data bases for inquiry and updates; and allows a logical connection from a CRT to multiple BSC lines, the spokesman stated.

The 3277 emulation provides a standard network interface for non-3277 devices; emulates 3277 on both the 4978 and 4979; and provides macro instructions for local screen definition. The printer emulation also allows screen images to be printed out on a 4974 serial printer and provides printer spooling of CRT screen contents.

Licensed programs necessary to implement the FDP in a Series/1 are the Series/1 Base Program Preparation Facilities, Control Program Support and BSC Program Support, the spokesman noted.

System management functions include master console designation of one terminal, mean terminal response time, traffic management statistics, BSC line status and similar functions.

The ITS requires a Series/1 4953 or 4955 processor with a minimum of 64K bytes; feature 2074 BSC single-line control; 4962 disk storage unit; and the 4964 diskette in addition to the printer and CRT terminals.

The ITS program will be available at the end of September for a monthly license fee of $110 for one year.

DP Salaries Currently At Record High: Study

(Continued from Page 1)

generally $1,000 to $2,000 less than their large counterparts, but the gains over last year were more substantial.

Programmer/analysts' salaries rose 11.5%; Systems analysts', 12.9%; and DP managers', 6.8%. However, DBAs' salaries remained static.

Salaries in small shops reflected relatively little change, the survey noted. Systems analysts realized a 6.7% gain; operators, 5.1%; but programmers and programmer/analysts remain in the $10,000 to $12,500 range.

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Suit Hits Tennessee Software Tax as 'Illegal, Invalid'

By Don Leavitt
Of the CW Staff

NASHVILLE, Tenn. — The Tennessee legislature acted illegally when it recently passed a law defining software as tangible property subject to the state's sales and use tax rules [CW, April 4], according to a class action suit brought in federal court here last week.

The law should be ruled "illegal, invalid and void on its face" and state authorities "should be enjoined from imposing tax assessments or attempting to collect taxes in any manner whatsoever under the legislation at issue," plaintiff Robert M. Sherin argued in the U.S. District Court for the Middle District of Tennessee.

In his suit, Sherin described himself as a person in "the business of software sales and services nationally [who] has done business in the state of Tennessee." The suit is "on behalf of all 'software persons' similarly situated," the complaint stated.

Last year Sherin — the president of Nova Computing Services, Inc. of Miami — battled the state of Florida over its alleged right to tax software.

In that contest [CW, Jan. 17], he won a ruling from Florida's Division of Administrative Hearings which held Nova sells "services" to its clients and the software that provides the services is intangible, nontaxable property.

The Tennessee suit is being brought at this time, Sherin explained, because the law being contested is scheduled to take effect July 1 and "enforcement would work a substantial, immediate and irreparable injury to software persons' property and interests."

The law is illegal, he argued, because it is directly contradictory to the decision handed down last year by the Tennessee Supreme Court in the case of Commerce Union Bank vs. George M. Tidwell, the state's Commissioner of Revenue.

In that ruling, the court held software was intangible and nontaxable under Tennessee law [CW, Aug. 30].

The law Sherin is challenging here was drafted after that decision and "violates the judicial division of power as set forth in Article 3, U.S. Constitution, which gives the judiciary, not the legislature, the last word in deciding" questions of law, he said.

Later in his suit, he noted the Tidwell decision is "final, and no further proceedings are pending in state court which could alter or modify that judgment."

Specifically, Sherin seeks a declaratory judgment "deciding the respective rights and duties of software persons and of the defendant [the State of Tennessee] as concerns all taxes, interest and any penalties imposed or assessed or attemped to be imposed or assessed by the defendent under said software legislation," in addition to finding the law itself illegal.

Finally, he asked the court to grant him "such other and further relief as may be proper" and the costs he has incurred in bringing the action.

While observers tend to agree with Sherin's argument that the courts have responsibility for interpreting existing law, several feel he has failed to recognize the legislatures' balancing responsibility to draft new law, even in the face of an apparently conflicting judicial decision related to earlier law.

SigDOC Invites Help In Standard Review

NEW YORK — The Association for Computing Machinery's Special Interest Group on Documentation (SigDOC) has invited its members — and anyone else interested — to participate in a review of the American National Standards Institute (Ansi) flowchart standard, ANS X3.5-1970.

For its part, Ansi's X3 sectional committee on computers and information processing would welcome ideas brought out by the SigDOC effort, according to X3 secretary Robert Brown of the Computers and Business Equipment Manufacturers Association.

Ned Chapin, chairman of SigDOC's flowchart committee, issued the invitation in the current issue of the group's newsletter.

Comments should be addressed to Chapin as chairman of SigDOC's flowchart committee at Infosci, Inc., Box 7117, Menlo Park, Calif. 94025.

Justice Backs Off From FBI Plan OK

(Continued from Page 1)

It has also been opposed by the Ford Administration's White House Office of Telecommunications Policy, the Office of Management and Budget, the Law Enforcement Assistance Administration, the Domestic Council Committee on the Right of Privacy and the General Accounting Office. The plan was also tabled by former Attorney General Edward H. Levi [CW, Nov. 19, 1975].

Several members of the House and Senate were disturbed at not being consulted in the Carter Administration's decision to approve the message-switching plan, and reaction was swift. Flaherty has been called to explain the approval at hearings before the House Government Operations and Individuals Rights Subcommittee that will be held within the next few weeks.

And Moss has sent a letter to Attorney General Bell calling the move a "reneging" on President Carter's promise of "open government, respect for the Bill of Rights and a desire to safeguard existing liberties of all Americans."

Moss, who called the act "a step backward into the past rather than an affirmation of promised reform," told Bell the FBI's computer system should not be expanded "to permit message switching for any purpose, especially in light of the FBI's previous record, unresolved questions concerning its activities and the agency's consistent refusal to cooperate with Congress."

If the FBI should go ahead with the system, he continued, "state and local criminal data systems could be absorbed into a potentially abusive centralized communications and computer information system under FBI control" that could "engage in surreptitious intelligence gathering."

Sources indicated the controversial plan was outlined in an April 27 memorandum prepared by White House staff member Samuel A. Carradine as part of his work on a team assigned to study the reorganization of the federal government.

That memorandum, which examined the history of the proeject, listed the members of the previous Administration as well as the congressional leaders who opposed the plan, sources said.

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"And our programmers have a lot more control. Because time lapses have been eliminated, they don't have to reorient themselves all the time to continue a job," said Howard Lackow, Second Vice President for Data Processing.

The LIBRARIAN/Online is a source program management system with complete Remote Job Entry and Remote Job Output facilities. Its interface to The LIBRARIAN gave Colonial Life online access with a full range of module updating and control functions.

Second Vice President Howard Lackow points to the steady increase in source code output since installation of LIB/OL.

The LIBRARIAN/Online is operational under both OS and DOS and supports CICS and other teleprocessing monitors. All of the updating functions available to programmers working in a batch LIBRARIAN environment can be invoked from teleprocessing terminals.

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Societies Called Upon to Intervene in Ethical Disputes

By Molly Upton
Of the CW Staff

DALLAS — Professional DP societies should take a more active role in intervening for DPers who are caught in situations where they are asked to work on projects they feel are unethical, one attendee told panelists at the recent National Computer Conference session on "Unethical Conduct in Computer Science and Technology."

In a short but intense plea, he said "the real problem is that people know what's right, but [they] like to eat. They know they face retaliation for their action so they manage to rationalize the project.

"The time has come for societies to play a role so an individual doesn't have to stand alone. This should not be left to ad hoc procedures," he said.

"Perhaps there should be an ombudsman within societies that people can appeal to for advice or to intervene, first quietly and then by publicizing the instance.

"In this way, at least, such things don't go on without a penalty and they might not happen again," he said.

Harold Borko, of the Graduate School of Library Science and Information at the University of California at Los Angeles, pointed out such actions, especially in court, can be complex. He questioned whether the society has the right to spend members' money on behalf of specific individuals.

But another attendee pointed out the Institute of Electrical and Electronics Engineers filed a friend of court brief on behalf of some engineers in one case that reached the courts.

The value of the action was not that it benefited the specific engineers, but that it served to set precedents for the entire society, he indicated.

Oliver Smoot, vice-president of the Computer and Business Equipment Manufacturers Association, said he agreed initially with the point that the societies should be prepared to do more for its members in this regard. However, he noted it would be difficult to limit the issues.

Societies could quickly get into areas normally handled by unions, such as work environment. That would require a very different approach by computer people in viewing their jobs, he added.

Bernard Galler, assistant dean of the University of Michigan, commented that when he had been president of the Association of Computing Machinery, he had occasionally received letters from DPers describing their plights with employers.

On an ad hoc basis, Galler said he would write to the president of the firm involved, notifying him of what was happening within his firm.

Davis Indicates Activity Under Way at Institute

Dr. Ruth M. Davis

(Continued from Page 1)

flecting the increased importance of computers, automation and information technology.

Reflecting on her tenure at NBS, Davis discussed the role the institute plays in administering the Brooks Act, a law she sees as designed to create central management within the government of a very complex and expensive technical resource — anything that has to do with computer systems.

Davis likened the system of computer resources management established by the Brooks Act to a three-legged stool consisting of the OMB, the General Services Administration (GSA) and NBS.

Central Management Goal

The goal of central management is simple and direct: to save money in the acquisition and utilization of computer and communications systems, she stated.

The OMB is responsible for fiscal and policy matters; the GSA, for procurement of systems and software; and the NBS, for standards and technical alerting functions.

"For 10 years we've been trying to see whether these three agencies can work together to exert their influence on activities Congress thought it was important to manage," Davis said.

"We haven't proved it can work, and we haven't shown it can't work; but we are showing that it isn't working," she added.

In the three-legged stool made up of the OMB, GSA and NBS, the standards and technical organization is the weakest leg — chiefly because the NBS lacks the authority to force agencies' compliance with its stances, Davis said. Federal agencies may chafe under OMB circulars and GSA regulations, but NBS standards are regarded as merely an annoyance, she said.

But Davis isn't dissatisfied with what the institute has achieved since 1970. She believes the growth of the standards program has made the institute and the Department of Commerce, the agency of which it is a part, places of action for government systems users.

Particularly in the last four years, the institute has ceased to merely echo the American National Standards Institute (Ansi) and the other voluntary standards organizations, she said.

The institute and NBS have been able to promulgate standards that primarily benefit users as opposed to standards that are de facto or motivated by special interests, Davis stated.

Standards Established

Among the federal standards the institute has put on the map and those dealing with data encryption, interfaces, software documentation, Cobol and Fortran validation and personal identification guidelines for signing on and off systems, she said.

Davis believes the institute and the NBS help keep the voluntary standards system that sets national standards in step with user needs, even as Ansi and others keep the institute on its toes. Certainly, common national and federal standards save everyone money, she maintained.

The I/O channel interface standard that would permit interconnecting peripherals and mainframes produced by different manufacturers is the only area in which the institute is attempting to make standard something already in use by federal agencies, Davis noted.

Many "forward-looking" standards in the minicomputer and terminal areas are underway at the institute, she said.

Davis believes that in the last few years the institute has also come to be the technical mediator in the computer-automation world between various interest groups where the final objective is national in scope.

For example, in the areas of export control, national security and private industry, goals often clash, she said. Until NBS stepped in to take part in these situations, the federal position was handled, and therefore dominated by DOD.

The institute is "now in the driver's seat" in the latest case requiring that technical safeguards be developed to prevent diverting the end uses of computer systems from their intended and stated purposes, Davis stated. The current situation involves Control Data Corp. and its proposed sale of mainframes to the Soviet Union.

NBS's Institute for Computer Sciences and Technology is also responsible for some very solid "and perhaps the most advanced work in automation and control technology," often referred to as robotics, Davis said. She believes the competence of the bureau in this area is probably unsurpassed in the U.S.

The institute's program in computer networking — "the principal area in which computers are now utilized" — is also a source of pride for its departing director.

Finally, Davis noted that the institute is in the midst of getting final approval for a government management mechanism for enforcing standards. "We have in place the economic and compliance mechanisms and governmentwide priorities needed in this area," she said.

In her job at DOD, working under the proposed title of Deputy Undersecretary of Defense for Research and Advanced Technology, Davis will dispense 21% or $2 billion of the total DOD R&D budget.

Davis, who received her Ph.D. in mathematics from the University of Maryland in 1955, will be involved in all of the sciences, including manpower training for every kind of activity policy making and work allocation for all of DOD's more than 100 laboratories.

"I really hope and believe that in the new job I will be able to influence electronics and computer R&D applications more than I ever could anywhere else — including NBS," Davis said. "You don't have to have money to get something done, but it's rarely a deterrent," she added.

In her new job in the Office of the Secretary of Defense (OSD) Davis will be across the hall from the office in which she worked as staff assistant for intelligence and reconnaissance from 1961 to 1967. "This one's a little larger, though," she said, laughing.

First employed by the U.S. Navy in 1955, Davis worked with the Navy's Nuclear Reactor Program, set up its shorebased Command and Control Program and served in OSD before going to the National Institutes of Health within the Department of Health, Education and Welfare (HEW) in 1967.

From 1967 until she went to NBS in 1970, Davis set up the Lister Hill National Center for Biomedical Communications.

Of her time at the computer institute, the outgoing director said, "I found that the interaction with Congress and industry, integral to involvement in the computer world at NBS, was very stimulating and I will miss it."

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Recent NCC Panelists Indicate

'Who Owns a Program' Depends on Type of Software

By Molly Upton
Of the CW Staff

DALLAS — Who owns a program — the programmer or his employer? This was one of the hotter issues discussed by a seven-member panel and several of the over 250 attendees at the session on "Unethical Conduct in Computer Science and Technology" here at the National Computer Conference recently.

Attendees indicated the answer to the question depends on the type of program. They voted on two different scenarios and, with slightly changed facts, reached different conclusions.

In both instances, the ratio of those deciding the action was "unethical" vs. "not unethical" or "no ethics issue involved" was markedly different from that of a seminar attended by about 30 people last March at Stanford Research Institute (SRI).

Donn Parker of SRI, leader of both the session and the previous seminar, said he had started with the concept that a program should be considered proprietary unless otherwise specified.

However, others had informed him the principle should be the converse: a program is in the public domain unless explicitly identified as proprietary.

The object of the seminar, whose methodology and findings were described at the session, was to precipitate discussion on ethics in the many gray areas in DP where laws do not explicitly cover situations.

Audience Ratings

The audience found "unethical" — by nearly a two to one margin — the act of a programmer who took to his new job with a competitor a production program he had developed at his previous job.

However, by a somewhat closer margin, the audience decided a programmer was "not unethical" in taking to a new job with a competitor all copies of a program he had developed for his personal use in his previous job.

In the first instance, by a 26 to 1 vote, the seminar at SRI had judged the action unethical, whereas here in Dallas it was more closely split at 13 to 11. However, the majority still found in unethical.

The voting categories included "unethical" action; "not unethical," which meant not bad, but not necessarily good; and "no ethics issue," which could also mean the action was clearly illegal.

Extensive Questions

The NCC audience asked extensive questions as it sought to more clearly define the problem. In this, it expressed the same frustrations as the previous smaller group.

But as Parker and other panelists explained, in real life situations, all information is not frequently available and one has to act on what is known.

Questions on the first scenario included whether the second employer hired the programmer with the understanding it would gain the use of this program and if the first employer specified the program was proprietary.

In the second instance, the audience wanted to know whether other programmers were also using the particular program in their work; if the program was transparent to the employer, and if there had been a nondisclosure agreement.

One attendee pointed out there were really two issues: the taking of the program and taking all copies of the program.

Program Protection

Panelist Oliver Smoot, vice-president of the Computer and Business Equipment Manufacturers Association, said he thinks it is unethical for an employer to not explain the status of a programmer's work.

He said he would have the first line of an employee's code be a copyright notice in order to protect the employer's interest.

"Programs are valuable things and you ought to protect them. Program vendors want to protect their investment in production programs," he added.

Bernie Galler, assistant dean at the University of Michigan, commented that in the old days everyone shared his programs. However, that situation has turned around now.

Creativity Restricted

One attendee from Australia bemoaned the restrictions business places on creativity. "If you did something on your own, you might want to share it, but business wants to stifle that," he said.

Susan Nycum, a California attorney with Chickering and Gregory, indicated that some states have very extensive laws as to what rights an employer has to creations of its employees.

In California, for example, an employer can own things produced by an employee in a discipline different from that for which it pays the employer, she said.

The Australian indicated he had been barred by his employer from publishing the design he had done on a multitasking real-time system, which was later used by the firm.

He explained he had developed the system while working as an electrical engineer for the firm and obtaining his masters degree in computer sciences at night school.

The ethics scenarios discussed and voted on by the group at SRI could be categorized into seven types: conflict over obligations; disputed rights to a product; confidentiality of data; and conflicts between personal morality, professional ethics and organizational loyalty.

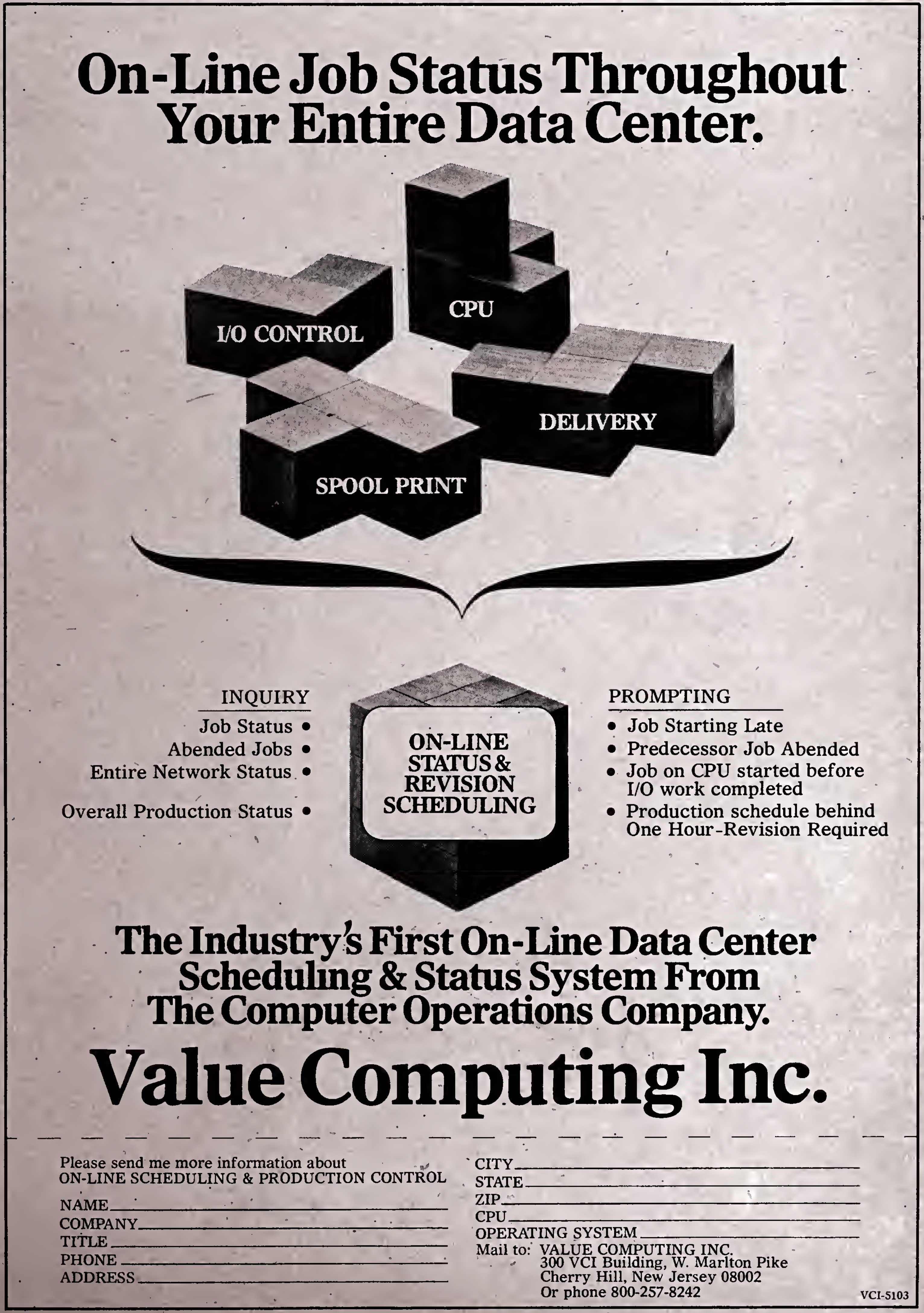
Other categories are: responsibility for social effects; responsibility to influence public opinion; and the validity of a computer in the decision making process.

Legal vs. Ethical

One rule of thumb used by the participants was that the law does not reflect ethics. An act could be legal, but not necessarily ethical, according to Galler.

Nycum commented the law has failed to keep up with the development of DP and isn't clear in many areas including proprietary data and privacy of data.

Smoot, in summarizing the discussions on confidentiality of data, said the group followed the rule that all data has an owner, and personal data intrinsically has a higher status than other data.



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NBS Plans to Adopt Standards for Minis, Terminals

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — The National Bureau of Standards (NBS) expects to adopt several federal standards for minicomputers and terminals between now and the fall of 1978.

Work is under way throughout the NBS Institute for Computer Sciences and Technology to develop standards that are "forward-looking" in terms of the current and future uses federal agencies might find for minis and terminals, according to Tom Pyke, chief of the Computer Systems Engineering Division at the institute.

In the minicomputer area, the NBS organization is working through the American National Standards Institute (Ansi) to create device-level interface standards for these processors. Standards for basic software and for minicomputer Cobol are also high on the NBS institute's priority list, Pyke said.

Federal agencies will receive an interface standard — "RS-XYZ" — to replace the familiar RS-232C interface between terminals and computer and data communications equipment.

By September, this new standard should provide the agencies with better performance from their terminals, he stated.

An extended Ascii code — with 8 bits instead of 7 — and a set of protocols standardizing the user-terminal interface are also key areas receiving NBS and Ansi attention right now, Pyke noted.

Mini, Peripheral Interfaces

The NBS institute is particularly interested in standards for interfaces between peripherals and minicomputers. I/O devices designed for large-and medium-sized mainframes are generally not suitable for use with minis, he explained.

Among the device-level interfaces which the institute is working on now will be a standard for magnetic tape peripherals for minis. This standard is intended to create a flexible disk interface in particular, Pyke said.

These interfaces for minis will probably form a subset in the family of channel-level interfaces for processors of all sizes being devised at NBS and through the voluntary standards organizations, he added.

Ansi's work on the development of these mini-oriented interface standards has proceeded much more rapidly than it did for larger processors, Pyke noted. Work in the mini area has only been under way for two years.

Federal 'Basic' Standard

The NBS wants to see a federal standard for the basic language because of its widespread use among single-and multimini uses, Pyke stated.

The Institute of Computer Sciences and Technology commissioned the University of Massachusetts to write a candidate standard for Basic and made the results of this work available to Ansi.

Ansi has used the NBS-commissioned work as the basis for its national standard for Basic. "We estimate that by active NBS intervention we sped up the availability of this standard by as much as two years," Pyke said.

He envisions a federal "Basic " standard in place during fiscal year 1978. The Basic standard includes a set of validation routines for the language's compilers or interpreters, Pyke noted.

The NBS institute expects to run the validation service for Basic that will help assure agencies' technical compliance with the standard, Pyke said.

Once again, the institute is working with Ansi and other federal agencies to develop a minimum Cobol particularly suited for use with minicomputers, according to Pyke.

The NBS is currently trying to assess the impact such a Cobol standard would have on federal agencies, he indicated. For example, how important would the standard be to their installations?

Additional Flexibility

Just as the proposed RS-XYZ interface for terminals is intended to improve performance, the planned extension of Ascii code should give federal users additional flexibility by making the character sets used larger, Pyke said. An 8-bit Ascii code should be a federal standard early in 1978, he added.

Protocols for the user-terminal interface need to and will soon go beyond standards for keyboards, the institute official stated.

The NBS is developing protocols for selected functions — albeit basic bookkeeping functions and primitive tasks associated with network use — in user-terminal interactions, he said.

"We want to standardize such procedures as 'log on,' 'log off,' and 'get me back to the monitor, please' in hopes of achieving a greater commonality between terminals and systems used by the agencies," Pyke stated.

CDC Fears Loss of Customers

(Continued from Page 1)

reconsidering its entire relationship with CDC," he added. Brown expects CDC will receive no further business from the $800,000 account. He told the court the Sollac DP manager is now in danger of losing his job because of the matter.

Brown also assumed that CDC "won't be doing much business with Montgomery Ward & Co. in the future" as a result of his testimony involving that company. "Montgomery Ward won't be receptive to being placed in the spotlight" by his testimony, he said.

Brown testified that, in the fall of 1975, CDC had proposed a large IBM-compatible disk storage system for the store's DP facility in competition with IBM. However, CDC representatives were told by the store that CDC would not get the order because the firm feared it would lose IBM system engineering support.

IBM told DP personnel "the level of system engineering support [Montgomery-Ward] got from IBM was directly related to the amount of IBM equipment it had installed. IBM told them 'this is not a threat, but a fact,' " Brown said.

It is difficult for CDC to do anything about that type of situation because users are dependent on ongoing support and maintenance from IBM and therefore don't want to be caught in the middle of a controversy between it and another manufacturer, he stated.

When asked why he reported these incidents if they would cause his company to lose business, Brown replied "it is not always possible to deal in generalities and one must use specifics if problems of this type are to be corrected in the future."

Brown's testimony provided specific details that supported the contentions of another witness, Richard Andreini, who testified recently that such preannouncements by IBM pesonnel occur frequently [CW, May 23] despite IBM's oral and written policy against it.

"It is difficult if not impossible for [a competitor] to react to preannouncements because they are dealing with the unknown. It is most difficult in the case of IBM which has great technical and marketing resources," Brown continued.

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Indications Point to a Compromise

Attorney Sees AT&T Adopting 'Willingness to Change'

By Ronald A. Frank
Of the CW Staff

DALLAS — There are indications that the Bell System is adopting "a willingness to change, a determination to progress, to compromise," according to John M. Eger, a regulatory attorney.

Speaking at a session on data communications policy at the National Computer Conference here recently, Eger traced the events surrounding the introduction of the Bell-fostered Consumer Communications Reform Act.

The bill, he said, may have been initiated last year to stimulate a broad national interest in the issues and problems relating to current telecommunications technology.

While this may have been the real intent of AT&T board chairman John deButts, the legislation had to be opposed because as it was written it was intended only to "cartelize" and not to reform the communications industry.

As proposed, it suggested "the strong possibility of nationalization of the entire communications industry," Eger said. And since the lines between computer and communications are blurring, it would have meant nationalization of the computer industry as well.

For these reasons, Eger said he strenuously opposed the bill.

Changed American Thought

Whether the bill was really intended to generate a debate about telecommunications policy is really moot at this point. The bill has resulted in a change in the state of the American mind on the whole subject of communications, according to Eger.

The "Information Age" we have all talked about is already here. The communications revolution, a revolution that the Reform Act was designed somehow to contain, or direct or control or even hold back, is already washing over us, Eger said.

And this has carried us beyond those issues to which the proposed bill was addressed, he added.

DeButts has seen this happen and he is now less concerned about the bill than he is about the policy debate it has started, he said.

Now that deButts and AT&T have "exhausted their views on the legislation," they have begun to move toward a much less parochial and more objective stand, Eger said.

Within the last few weeks, AT&T has begun to make some "alternative suggestions" that suggest "a little different way of looking at things," Eger noted.

Similar alternatives have yet to be put forward by those who oppose Bell including those in the computer industry, but "I am sure the logjam has been broken and that those suggestions will be made," he said. An exchange of ideas on the future role of telecommunications has begun, he suggested.

"The question is not how do we go on fighting and perhaps crippling this invaluable national resource, but rather how do we help it to survive?" Eger asked. A way must be found to enable Bell to enter the computer communications area, but not as a disruptive force.

"We must find some way to free Bell from this long-standing and, until now, justifiable necessity to think only of itself and to act only as a protected monopoly," he said.

Health Care Systems Seen Lacking Control

By Toni Wiseman
Of the CW Staff

DALLAS — Although the information revolution has pervaded nearly every aspect of modern industrial life, the health care system — replete with an overdose of information — lags behind in management and control, Thomas T. Chen told attendees of a National Computer Conference session, here recently.

"Although there are isolated examples of the use of information technology in the health delivery system, these are fragmented and usually limited to isolated processes rather than to an integrated information system," according to Chen, assistant professor of computer science and assistant director of medical information science at the University of Illinois.

"This underutilization is largely the result of an isolation of the health professional and the physician from any substantive knowledge of computing.

"'Computer ignorance' has led to overexpectation and consequent disappointment and failure," Chen said.

To counteract this situation, Chen noted the University of Illinois is planning a formal structured program to train health professionals in biomedical computing.

The university's program is being designed to enhance the understanding of computer science and its relationship to clinical medicine, basic health sciences and the health care delivery system. In addition, it seeks to encourage career development in medical information informatics, Chen indicated.

The emphasis will be on training academic M.D.s, not primary care physicians, he noted.

The university will use its network of 80 terminals for the project, Chen said. The system ties in with the Plato-based education facility for universities around the country.

The complete medical information sciences program will consist of four current curricula, he stated. The undergraduate premed student will be encouraged to take regular sciences computer courses.

In medical school, the student will study basic sciences, through computer-aided instruction, at his own pace. While he will not be taking any formal computer courses, he will be interacting constantly with the terminals and thus gaining experience and a familiarity with DP, Chen said.

When the clinical sciences program begins, the prospective MD will take formal structural classes in medical information sciences.

A post-graduate program will lead to a M.D. masters in computer science. The program, Chen emphasized, will be managed through the Department of Computer Science, not the School of Medicine.

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Distribution Difficulties

Software Thievery Cited as Thorny Hobbyist Problem

By Esther Surden
Of the CW Staff

DALLAS — A spirited group of "technological junkies" examined issues surrounding software in the personal computing arena at the National Computer Conference here recently.

One of the thorniest problems facing developers of software for personal computers is how to distribute it, according to Gary Kildall, a consultant with Digital Research. "How can we market it so it won't be widely stolen?" he asked.

Software is currently being passed on from individual to individual or from manufacturer to manufacturer with little regard for how much it costs to develop, he said.

One way to combat that problem is to get a lawyer who knows both software and law, but this is a difficult combination to find. Copyrighting is the "most obvious" thing to be done and "the easiest to do." However, under copyrighting, product listings must be made public, he pointed out.

Protection from unauthorized use of programs can be achieved under trade secrets laws, but the company must then keep all knowledge of the programs internal.

Although many will say that software is not patentable, "hundreds of programs have been patented," he added, although most of these deal with specialized areas.

Contractual agreements regarding software are "pretty much worthless as far as I can tell," he told the group, and licensing agreements are "far too complicated."

His firm's software has not been widely stolen because "the price is very low. People don't feel that they've been ripped off, so they don't want to rip us off," he continued.

Besides, "people who take software and copy it for as many friends as they can are not looked on as ethical."

"Effectively, I feel all software should be free," another panel member, Robert Uiterwyk of Microcomputer Systems, told the audience. Uiterwyk is a user who developed a version of Basic for the Motorola 6800.

"I am of course an exception to the rule in that most people here have to rely on software to support them," he stated. If all software can not be free, the developer "should work for the $25 range," he told the panel members, because "if you sell several thousand copies you will be adequately rewarded."

"Good software is not free," Dennis Allison of Stanford University disagreed. "It involves a good deal of time and effort expended by somebody and a large front-end investment."

The problem develops because the user sees the hardware — but not the software; he therefore cannot rationalize spending the money on it.

"When we started off, we offered software at basically the cost of the media we distributed it on to the hobbyist and had a second cost, about 10 times as high, to the commercial user," according to Neal Colvin, manager of software at Technical Design Laboratories. "We discovered an awful lot of commercial hobbyists."

Since this method encouraged stealing, the firm decided to boost its price to everyone, but "increased price caused increased copying." The firm then started "bundling" software in with the hardware. "It doesn't give people options anymore," he said, but the firm is not being ripped off.

Another way for users to obtain software very cheaply is to use the software libraries sponsored by the vendors or certain universities, William H. Gates of Microsoft said.

There is no guarantee, however, that software obtained through this method works, Allison added, and "I'm certain no one wants to support it."

There are a number of ways to prevent thievery, Allison continued. Each copy of the software can be registered and have a serial number associated with it, or the software can be delivered on a read-only memory.

The latter method probably needs a long lead time, so the manufacturer must make sure all the bugs are out.

Programming Languages

Switching the topic to programming languages available on personal computers, Paul Allen of Microsoft described Basic, Fortran, PL/M, Algol, Pascal, APL, Cobol and RPG-II as they relate to users.

Basic "was the first language to be released" and is easy to learn and implement. But the language itself leaves a lot to be desired, he indicated.

Fortran, a scientific language, "isn't necessarily the cleanest language in the world," while PL/M is not "a very rich language."

Algol and Pascal are "elegant block structure languages," but there are few implementations of these, he continued.

APL, which Allen described as "terse," is math-oriented, although Cobol has been designed for an Intel 8080-type system, it and RPG-II require a large compiler to implement them, he said.

"There is a cult that says that Basic and Cobol are bad languages," Microsoft's Gates said, but there "really are no viable alternatives." Other languages take too much time to implement or have a theoretical elegance that is too hard to learn, he contended.

"There is a need for a good high-level programming language," he stated.

"Is it reasonable to expect that the entire world will become programmers?" Allison asked the group. Most people don't want to program in Assembler. "It's entirely plausible they don't want to program in any of the other languages either," he said.

"What is really needed is a language with consistency and simplicity," he said. Abandoning Basic as the de facto language of personal computing is a necessity, he believes. "I think we ought to accept our losses and go on from there."

Uiterwyk disagreed, saying "no one language has yet or is going to solve all our needs.

"We've got Basic; its got lots of problems. But on the other hand the structured languages have lots of problems too," he said.

ICCPers See Tests Best for Self-Examination

By Don Leavitt
Of the CW Staff

DALLAS — None of the members of the councils administering the test programs of the Institute for the Certification of Computer Professionals (ICCP) see the tests or the certificates awarded to those who complete them successfully as ends in themselves.

Earning the Certificate in Data Processing (CDP) is a step toward professionalism, but "that doesn't mean you can't be a 'pro' without it — or that you are a 'pro' just because you pass it," Prof. William Horne of Boston College said here recently.

In much the same vein, Prof. William Cotterman of Georgia State University told the National Computer Conference session reviewing the examinations of the ICCP that earning the Certificate in Computer Programming (CCP) "will have little direct value, at least at first."

The testing for the new certificate — scheduled to be given initially in October — will be most useful to those who take it as a self-examination, to see for themselves just how well they can cope with a range of questions their peers submitted and then refined as appropriate for senior programmers.

Although described as a single examination, the CCP test will actually be divided into two basic sections. One will contain questions covering topics common to all programming; the second will provide the programmer with the chance to focus on his particular area, whether it is business, scientific or systems programming.

Debate on Purpose

Describing the planning that has gone into the CCP examination, Cotterman noted there was "considerable debate" about its purpose: Should it be aimed at identifying an elite corps of programmers — "somewhat akin to the Association for Computing Machinery's Turing Award" — or a more general vehicle for recognizing excellence?

The answer to that question obviously was to aim for excellence, he said.

Although the general portion of the 200-question test will not include questions on specific programming languages per se, candidates are expected to possess a reading knowledge of Fortran, Cobol, PL/I and an assembly language, Cotterman said.

Questions throughout the examination may be presented in terms of those languages, he said, adding that he made no apologies for the use of Fortran, Cobol or PL/I. The test is supposed to be vendor-independent and those languages certainly meet the criteria, in Cotterman's view.

Just by its nature, assembly language is machine-specific and the test has included IBM's Assembler in those questions that have to do with low-level programming problems. The IBM share of market seemed to make this choice the only logical one.

Earlier in the session, Horne noted the CDP examination has always been intended for DP managers — "not programmers, not systems analysts and not even operations managers" — but just those managing (or hoping to manage) the entire DP installation.

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U.S. Opposes Volume-Sensitive Line Charge Proposal

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — The U.S. has informed Europe and Japan that it opposes the abolition of flat monthly charges and across-the-board application of volume-sensitive rates for leased private lines.

Proposed by the Italian representatives to the 154-nation Consultative Committee on International Telephone and Telegraph (CCITT) at its recent meeting in Geneva, the move to change the rate basis for leased circuits would drastically increase international telecommunications costs, according to U.S. industrial users of international private-line services and DP vendors [CW, May 16].

Ultimately, the CCITT group considering the Italian contribution agreed to study flat rate vs. volume-sensitive charges for private lines, but not before the U.S. stated it did not want the examination to prove preexisting conclusions that leased circuits are "out of date" or "out of control."

Representing the U.S. delegation, Earl S. Barbely of the Federal Communications Commission (FCC) stated it appeared the Italian contribution had already arrived at these conclusions regarding charging practices for leased circuits.

If a study were undertaken, Barbely said, the unquestioned statements and premature conclusions expressed in the Italian paper proposing the examination could prejudice its results.

Basis of Disagreement

The U.S. disagreed with all of the assumptions underlying the Italian proposal, among them that the system of private leased lines was established "mainly to relieve Telex exchanges of considerable volumes of traffic," he said.

Japan and several European countries, including France, the UK and Spain, expressed partial support for the Italian government's suggestion and concluded that a study of volume-sensitive pricing alternatives was warranted.

Rates should be based on the concept of service provided as well as its cost, the delegate from Spain told the group.

The minutes of the meeting also indicate opposition to the Italian proposal by two international user groups — the International Press Telecommunications Council (IPTC) and the International Airline Transportation Association (Iata).

Charges for leased circuits should cover the expenses the various administrations incur to provide them plus a reasonable profit, the IPTC representative said.

Iata representative expressed concern over another major drawback to the Italian proposal: that volume-sensitive pricing would require substantial modification to the technology of systems based on private leased lines. Many leased circuit users like General Electric Co. (GE), members of the Association of Data Processing Service Organizations (Adapso), the airlines and the U.S. government have spent a great deal to upgrade the transmission quality and capacity of these lines.

For their part, the Italians said there was no question of suppressing private leased circuit service, even though volume-sensitive pricing would cause these lines to compete with more recent developments in telecommunications services, such as packet-switching.

Although his delegation had some serious doubts about the value of a study, Barbely said the U.S. will contribute to any serious effort to compare the costs of flat-rate and volume-sensitive charges for leased lines.

He insisted, however, that existing services, including leased circuit charges on a flat-rate basis, remain available to users.

But this assurance was not enough for Brendon A. McShane of GE. He has written to the U.S. State Department's Office of International Communications Policy asking that a national meeting of CCITT members be held to determine what U.S. policy will be, given the potential for volume-sensitive leased line charges.

McShane is particularly concerned that U.S. users and carriers be in agreement regarding the Italian proposal.

Ronald B. Wheatley of the State Department said he doubts such a meeting will be called. Barbely and his group will meet again sometime in August, and the State Department considers it their responsibility to call a national meeting of the CCITT, he added.

"It appeared to me that we successfully challenged the assumptions underlying the Italian contribution," Wheatley said of the Geneva meeting.

Stanley S. Schneider of Arinc, which represents the airlines, called the Geneva discussion of the Italian contribution "uneventful," although he discerned some support for the measure among the U.S. carriers. Schneider considered his organization well-represented by Barbely.

Schneider added that as a user and as a carrier, Arinc would suffer "a very significant cost impact if we have to pay for leased lines on a message count basis."

There was an obvious sentiment in Europe for the Italian contribution, according to Joseph O. Wellington of Comsat General Corp. He believes the Europeans saw the U.S. as "somewhat paranoid" on the issue.

Should Have Alternatives

Comsat believes users should have alternatives, Wellington said. If usage pricing works for the small user, he should have it. Large users like GE and the U.S. government should be permitted to use and improve private leased lines, he added.

However, Wellington does believe flat-rate and volume-sensitive services should complement each other. "The private-line voice-grade channel should bring in the same amount of average monthly revenue as the channel with message toll pricing," he stated.

A national meeting to obtain a unified U.S. position on the issue of the Italian contribution "wouldn't be easy because the U.S. carriers don't feel as strongly about it as the U.S. user groups do," he added.

Nearly all of the carriers have message pricing for their overseas digital data services, Wellington noted.

Such volume-sensitive services may someday replace private leased lines, but such a change "isn't right around the corner," according to George F. McGuire of Western Union.

If leased circuits are to be phased out, McGuire would prefer to see them go because of technological changes rather than as a result of a CCITT directive.

Neither Wellington nor McGuire believes the Italians intended to do away with private leased lines in this manner, although McGuire acknowledged "that might have been in the back of their minds."

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Poor Management Affects DP Workers Too: Consultant

BY Esther Surden
Of the CW Staff

NEW HAVEN — Data processing personnel, like many other workers, are victims of poor management, according to Edward J. Feeney, president of Edward J. Feeney Associates.

It's important to establish a measurement and feedback system, the consultant told attendees of a recent conference here. "If people are rewarded for their performance, they tend to do more of that kind of thing," Feeney said.

Behavior modification techniques can be applied to programmers, systems analysts, project leaders and lead programmers, he told the group.

A basic problem DP managers face is learning how to tell a performer what is expected of him. "Managers have difficulty learning how to quantify performance," Feeney noted.

It is difficult to specify exactly what is good and bad behavior, but appropriate feedback is important, he indicated.

The Human Connection

In some cases supervisors have the necessary data available, but they don't pass it on to the worker in an effective manner. "To be effective, feedback systems should be immediate," he emphasized.

Sometimes Worker A does the job and Worker B gets the feedback, which is inefficient, he said.

Behavior is determined by its consequences, Feeney noted. No one is going to work hard 365 days each year for one merit increase in January. In fact, in most organizations, workers who work harder than other workers receive the same vacation, the same pay and the same benefits, he said.

Appropriate Rewards

Managers have to look at ways to design rewards for good work. Rewards should be readily available — something the individual definitely wants, not what the manager thinks the worker wants, Feeney continued. Rewards should be something that can be given on a contingent basis so they can be withheld if necessary.

Some good job reinforcers are simply such things as praise, money, extra benefits and better tools with which to work. The worker could be assigned a preferred task or given time off as a reward for a job well done.

"Praise can be very powerful if the supervisor is very specific about what is being praised," Feeney said.

For those workers who are making errors, Feeney recommended that the manager not be critical. Instead, he should explore several alternatives.

One of the alternatives would be an award for any sign of improvement. Or, the manager could "prompt the desired behavior and after it's been completed, reinforce it," Feeney said.

Avoid Error Reinforcement

Managers should ignore errors in order to avoid reinforcing them and should reward random improvements. At the time of the reward, the manager should let the worker know why he's being rewarded.

For someone who is making errors in parts of his work, but doing well in other areas, Feeney suggested that the supervisor find the parts that are well done and set a goal for the rest of the project.

In one case history offered by the consultant, a data entry department suffering from slow entry of documents needed some reinforcement.

The supervisor corrected the problem by arranging to have a message appear on the CRT screen addressed to an operator who had entered 42 documents into the system. The message read, "You have just set a record for entering documents."

It then became a record for the others to equal or beat.

Some organizations work on cycles — with a month-end crunch. Production can be kept up during the month if rewards can be scheduled during the month.

One organization Feeney cited was working at a feverish pitch for several months. When he asked the manager why, he was told that his DP department was preparing a proposal for the company president.

Feeney suggested that productivity could be kept up by scheduling more such presentations.

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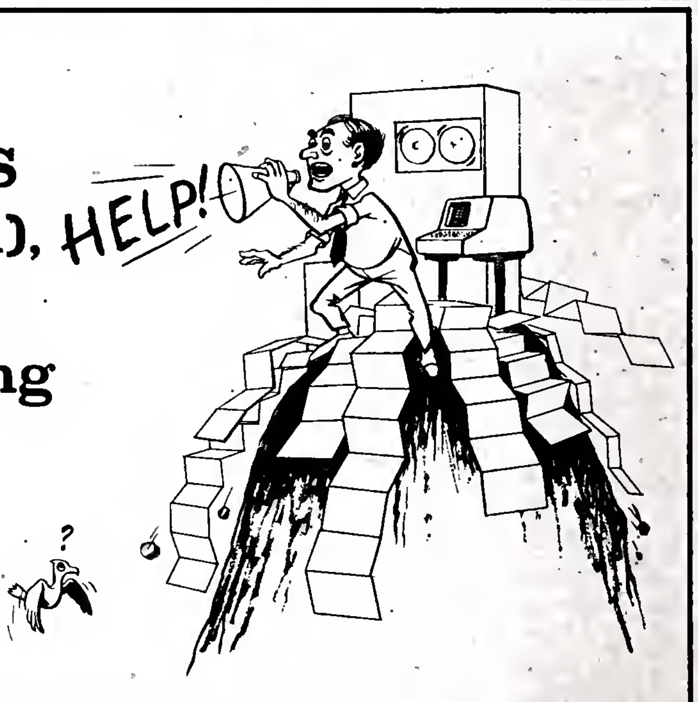

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The PACE for Today...and Tomorrow

DDP Seen Bringing 'Trouble Spots' With Political, Procedural Change

By Ann Dooley
Of the CW Staff

NEW YORK — Distributed minicomputer systems will cause enormous "people problems," according to management consultant Belden Menkus.

Speaking at a recent Computer Caravan session here, Menkus went on to outline three primary trouble spots when introducing a distributed DP (DDP) system into a company.

First, it will result in "political and procedural changes with more profound impact than those that resulted from the original introduction of the computer," he said.

Secondly, the failure to deal with the people problems involved in setting up a DDP system could lead to problems and negative reactions from management.

Finally, the size, role and influence of the management information system (MIS) staff will be altered with the introduction of DDP, he said.

Operating under a DDP system, the traditional need for a large staff and highly technical personnel will diminish, Menkus continued.

Once management discovers it can get answers for itself under a DDP system, the level of expectation will rise, he predicted.

Management will also be more interested in its return on investment. It will want to see direct improvements with DDP and will not be swayed be the fact it's the newest DP technology, he noted.

The industry will also go to a more standard environment, he said. "Eventually, we will be able to buy chips off the shelf."

In addition, legislation governing computer crimes will cause standardization of procedures, he forecast.

Shift in Control

Control of MIS decisionmaking will shift, Menkus warned. Before DDP, the MIS staff "shoved" management into change by claiming the need for "technical optimization," he charged.

Now, with DDP, decisions will be made by corporate management from the standpoint of cost effectiveness, he said. The possible loss might not be worth the benefits from a management perspective, he noted.

System upgrading will occur rather than pure maintenance of technology as in the past, according to Menkus. "Vendors could be in for real problems," he said.

Staff Changes

Previously, the MIS staff worked with a continually growing staff whose work was considered too technical for the layperson. But, it lacked a sustained knowledge of DP technology or real information on user goals or priorities, Menkus claimed.

Such a staff would not be interested in the problems of the field workers, he said.

In the post-DDP arena, a smaller, relatively stable staff size will appear with increased specialization in DP techniques and/or information on the user environment, Menkus told his audience. And in many cases, the company just won't need the "brilliant people because it can go out and buy software off the shelf," he said.

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Editorials

Well Done . . . Again

With a record number of both exhibitors and attendees, the recent National Computer Conference was clearly a success of major proportions.

And a great deal of the credit for that success has to go to the local committee headed by Dr. Portia Issacson, who enthusiastically supported and boosted the show from its inception.

In addition, the staff at the American Federation of Information Processing Societies also deserves credit for keeping the largest show ever on course and running smoothly. The enormous amount of preparation and logistics seems to get smoother and smoother each year.

Clearly, the organizers of the 1978 show in Anaheim, Calif., are going to have a hard time surpassing the show put on this year.

A Refreshing Breath

Many may feel that holding the Personal Computing Fair along with the National Computer Conference was just a gimmick to boost attendance for the overall show.

But whether or not that was the original intent, the idea was clearly a good one.

The attendes at the fair were a different sort than usually found at NCCs — a refreshing breath of air in what is getting to be a somewhat staid business.

A visit to the fair enhanced one's appreciation of the hobbyists and of the clever things they are doing with microprocessors and kits.

Many feel the hobbyists are the way of the future in the computer business. We can't agree with that.

However, it is clear that recreational computing will grow as a hobby, providing fun for both the hobbyists themselves and those lucky enough to see the results of their work at such events as the Personal Computing Fair.

'Software Is Tangible — It Is Not — It Is — It Is Not — It Is . . .'

Letters to the Editor

Structured Methodologies Lack Acceptance for Several Reasons

Gopal Kapur's article, "Conflict Over Structured Methodology Goes On" [CW, June 6], appeared as a poorly disguised advertisement for a conference he plans to sponsor. The aim of the conference is "to provide the DP professional with a complete and objective analysis and evaluation of structured methodology."

There appeared to be a suggestion that it is the absence of this objective evaluation that accounts for the low level of acceptance of this methodology by DP professionals. I would like to question that suggestion and make one of my own.

If structured methodologies were costly or high-risk, then the absence of an objective evaluation of the costs and risks would clearly deter a "professional" from adopting them. However, the costs and risks of such methodologies are trivial when compared with the cost and risk of human error and product failure that we tolerate in programming.

Since any DP professional can subjectively demonstrate that fact to his own satisfaction in a few minutes, there must be a reason other than the absence of objective evaluation that DP professionals are not rushing to use the methodologies.

I would like to suggest different reasons. First, the methodologies are not DP methodologies, but management methodologies. Therefore, while they should be of interest to DP managers, they are not of interest to all DP professionals.

Second, while they include methodologies for structuring both resource and product, their contribution is for managing product and quality. Since most DP managers manage programmers and schedule, these methodologies are of little interest to them.

However, there is still hope. The cost of poor quality is approaching the limits of tolerance. There are now enough successful projects around to demonstrate that DP management need not be promoted or even tolerated in the face of repeated failures. Even the most recalcitrant are going to be forced to the new methodologies or forced out.

William Hugh Murray

Norwalk, Conn.

The Game of Chance

Louis Fried, designer of "The Project Game" [CW, June 13], appears to think the throwing of a die and the throwing of six coins (counting heads only) are equivalent.

First of all, a die has 1 through 6, whereas the coins could have 0 through 6. Secondly, on a die there is a 1 out of 6 chance of throwing any number from 1 through 6, whereas with coins the chances differ with each number.

The chance of throwing a 6 with a die is 1 out of 6, but with coins it is 1 out of 64. Using coins for this game makes it very difficult to proceed past Block 1, since the chance of throwing a 5 or 6 is only 7 out of 64, whereas using a die there is a 1 out of 3 chance.

The game is difficult enough using a die without making it impossible by using coins.

John S. Yingling

Washington, D.C.

Perspiration Power

As a former IBM DP salesman, I know the company expected superhuman efforts. I never knew, however, that the company counted on my energy output to heat their building ["Windy City's IBM Plaza Recycles Heat to Conserve," CW, June 13].

Based on the article, the IBM employees' energy output is 240 BTU/min or 14,400 BTU/hour. That is some superhuman effort — most adults in an office environment give off 240 BTU/hour.

Cornell Dawson

Hyde Park, N.Y.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Data Past

Five Years Ago
June 28, 1972

WASHINGTON, D.C. — Congress proposed disclosure of federal computer-based dossiers on individuals pending passage of a bill in both the House and the Senate. The measure — known as the Citizen's Privacy Act — would prohibit government agencies from disclosing the files to anyone without the consent of the data subjects and would also require the agencies to notify an individual if they planned to start a file on him.

— — —

WASHINGTON, D.C. — The General Services Administration restricted the use of simulation systems as a tool for comparing computer equipment in favor of benchmark tests of proposed computer equipment.

Eight Years Ago
July 2, 1969

ARMONK, N.Y. — IBM's expected unbundling announcement shook computer users when they realized that program licenses (including Cobol, PL/I or Fortran) might cost them as much in monthly rental as a high-speed printer.

— — —

MINNEAPOLIS — Control Data Corp. announced the 6700, a powerful computer with matured software. The system was 40% more powerful than the superscale 6600 and cost approximately 10% more.

Computing 'Baptism-by-Fire'

User Makes 'Natural Transition' Into World of OEM

By Jack Stone

Special to Computerworld

NCC '77 was a spectacular show! Overwhelming!

The papers were superlative, the exhibition dynamic, the Convention Center expansive and the crowds crushing, particularly in the personal computing display areas. I thought it was just a grand time for all.

As an example of how many products and services were shown on the floor, I compiled a list of acronyms, trade names and hallmarks which should be carried in every computer person's active technical vocabulary, at least until NCC '78.

For your speaking pleasure, I suggest: Adabas, Basis (not to be confused with Basic), Complot, Diceon, Eclipse, Flippy-Floppy, Gershire, Hyperbus, Intershake, Juki, Ka, Lithocom, Moduperf, Naked-Mini, Omnitec, Pluribus, QIC, Redactron, Techtran, Unireel, Verbatim, Wavetek, Xerographic, Yelnow and Zeta.

Real Stars

But the real stars were the people — both presenters and presentees. I don't recall meeting and talking with so many interesting and delightful people, in so short a time.

Just a few that come to mind — peripatetic Roger Stephens, president of Nucon; indefatigable Bob Korfhage, chairman of the NCC '77 Program Committee; hard-working Kathy Quinn, supreme coordinator of the Computer Caravan and her bearded sidekick, the indomitable Ed Bride, Caravan director; Karen Duncan, queen of Sigbio and health computing; and effervescent Ben Knowles, king of DP long-range planning.

"Well, NCC '77 is behind me," I thought as I entered the Dallas/Ft. Worth airport lounge to await my flight to Washington.

The view of the Texas countryside was majestic and the ambiance serene, as it was early afternoon on a glorious sun-lit day. For a while, at least, I was having a respite from EFT and PDP and DSS and Mumps and Unix and whatnot.

Post-NCC Conversation

A nearby passenger and I struck up a conversation and carried it along during the plane trip east. "Got business in Washington?" he asked.

"Nope, goin' home," I replied. "What business are you in?" I went on.

"Well, I'm in advertising primarily, but I've been getting into some new things lately."

"Hey, that's great news," I said. "I'm in the mood to talk to someone far, far removed from a high technology bent. Tell me who you are and how you program and recompile human desire and emotion to sell your clients' products."

"My name's Bill Sauro. Before you jump to conclusions about me being out of the bit and byte streams, I've got to say one of my new things is being an OEM, supporting the [Digital Equipment Corp.] product line for the small business market."

'Natural Transition'

"How did a media person like you ever get involved with the chaotic world of DP?"

"It was a natural transition," Sauro responded. "I first became interested in advertising during college when I was a journalism major at the University of Arizona. I started college with strong interests in electrical engineering, derived from my hobbies, but I switched after my first year since I didn't see enough human participation in the engineering development process.

"I suppose I also changed because communications — human, that is — had been very much a part of my upbringing. My father was a writer.

"In any case, my education and early experience as a newspaper reporter led to the formation, in 1968, of Creative Advertising Co., which is jointly owned by me and my father. Our customers have been good to us: our gross billings are now in the $2 million category.

The Human Connection

"Our first real interest in computers came two years ago when our increasing business volume required that we consider hiring a bookkeeper. At that time, my wife and I were spending literally every other weekend getting our accounting records resolved.

"By chance I heard a radio ad for a small business computer and contacted the company for information. I met with Bob Davis and Tom Sprawls from the company, two first-rate programmer/analysts. I outlined the needs for a comprehensive administrative system for our advertising agency.

"I guess we had some kind of chemistry, because they both left their company to open their own systems software development firm, with our company their first major customer."

I then interjected, "So your 'computing baptism-by-fire,' as it were, came in the role of a user."

"Quite frankly, Bob and Tom did such a great job, the installation and operation have been flawless. And it's a big system even though it runs on a [DEC] Datasystem 352 with dual floppies.

"In our major application, we use a 'one-shot' procedure to process a bill from a TV or radio station, charge our customer the gross, pay the vendors involved and make the proper entries in the general ledger. The system also generates reports of profitability by account, forecasts cash needs and handles our payroll — we have six employees."

"So then you became a DEC OEM?" I asked.

"Yes, we teamed so well I joined Bob and Tom to form Creative Data Systems, based in Phoenix, to develop and market DEC-based systems to small business accounts.

"And frankly, we've been very pleased with our progress during the year we have been operating. We have installations with a car dealer, a copper mine, a racket-ball club, a fund-raising organization, a travel agency and a mail order house, to name a few. We currently have three DEC machines installed in our offices for development and production work."

"Do your DP successes imply that you'll soon be phasing out of your advertising practice?" I asked.

"Heavens, no!" Bill exclaimed. "Not only has our regular advertising business been expanding, but we will soon announce a non-DP marketing and advertising package specifically designed for the small business system OEM.

"As you very well know, most OEMs are great in the technical area, but very light on communications expertise. I'll be applying the lessons that we have learned in marketing our data systems in the Southwest to improve the advertising capabilities of OEMs around the country!"

Time to 'Level' With Public

DP's Mystery Will Remain Along With Imperfections

The Taylor Report

By

Alan Taylor, CDP

That computers and DP in general are mysterious and frightening is not news. It has been this way for as long as any of us can remember.

The problem is still worth examining, however, because the old answers are no longer valid and new explanations must be found.

The old answer basically was that the mystery and fright came with unfamiliarity and lack of understanding. If this was really the case, then mystery and fear should have dissipated in the same way that fear of television quickly dissipated.

Certainly by now, a quarter-century into the computer age, we should have gotten beyond it. By now computers and computing should have been integrated into the social framework as normal items.

The fact is this has not happened, suggesting that a more basic and more accurate reason for both the mystery and fear should be found. Last week the juxtaposition of two items I came across suggested possible reasons which I find persuasive and enlightening.

The first item was an account of a problem the new Federal Bureau of Investigation (FBI) computer-crime group faced in a fairly mundane case. The group was set up about a year ago to combat computer crime and has learned all about operating systems, dumps, programs, compilers, billing systems, etc.

It has assessed the caliber of the people it may be facing as being high, but it is ready to jump in and perform with its new technical understanding.

Stealing Time

In this particular case, understanding was no problem. It appeared a couple of programmers were running their own private business on their employer's machines, but they weren't using any of their employer's files. The programmers' business was providing musical arrangements, using programs they had written themselves.

The skill of the FBI group was in no way outclassed. They were able to go into the systems, extract the programs, read them and confirm that the people were not merely actually performing the musical arrangements, but were also handling billing and other accounting functions on the system.

While the FBI's education was complete, the mystery continued in full force. In this case the mystery was whether or not it was an FBI matter at all.

It turned out that stealing computer time is not a federal offense. The commodity — or whatever it is — just doesn't fit into any of the categories. It is neither animal, vegetable or mineral, yet it can hardly be called intangible or abstract.

Reason for Mystery

Here we have the first clue as to why they mystery continues after the initial unfamiliarity has passed. The FBI understood what was happening, but the nature of the events was foreign to the definitions of the law. Time, for instance, does not get taken across state boundaries.

The FBI had, of course, previously handled new technical matters such as unauthorized telephone use. The answer in that case was to regard it as being a matter of stealing electricity.

It may be that this will again be resorted to in the cases of computer time theft, although it wasn't in this case. (Here they used mail fraud as the indictable offense.)

Being able to evade a question, however, begs a question instead of answering it. The unanswered question — "What is computer time in our traditional framework?" continues unanswered and is apparently unanswerable.

Basis of Fear

Mystery regarding the nature of computers, while sufficient to puzzle the FBI, is not enough to explain the public attitude toward computers, which is an amalgam of acceptance, use and occasional fear.

A second incident during the same week showed where that fear comes from — at least in part.

The item concerned was a letter to "computer professionals" from an association of computer professionals — the Data Processing Management Association (DPMA).

The address of the letter — sent to me by its disgruntled recipient — had been taken from a name and address list which included professional titles (probably a magazine subscription list, where the provision of such information gets you a free subscription).

No Title Field

Just what happened then is anyone's guess. It is quite possible that the name field descriptor was really a "first line of address label," where the professional title was simply pushed into whatever space was left over.

There just can't have been a "title" field as such, because when the software searched the name field to find the last name, it came up with the abbreviation used for the title. "Dear Mr. Adv" was the salutation.

Naturally, the recipient was annoyed. He thought it was "unprofessional" because the result was wrong — blatantly wrong.

I can understand what he said, but I don't agree with him.

Point of Disagreement

I think that you will agree that the cause was not blatantly wrong. Incompletely identified fields and failure to check the full output against such errors (relying instead upon the return of undeliverables as an adequate quality test) are common with computers. And I think they will continue to occur.

Yet nothing is more frightening than this mixture of reliable output and blatantly wrong output. And rightly so.

As far as I can see, the public is ready to understand computers provided that we in the profession level with them.

The miracle of something that can accurately handle 5 million multiplications a minute is no longer a mystery. The mystery is how such an all-knowing thing cannot recognize something obvious like the last name of a perfectly ordinary name and address.

We all know the real reason and we know that it will continue. Why don't we level with the public and tell them that computing is something really new and in its complexity it will produce some humanly ridiculous errors.

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The Great Code-Off — Part 2

Henry Ford of Software Still Hasn't Made Appearance

By Miles Benson
Special to Computerworld

The Sociology of Computing

The dichotomy between Alchemy and Softli did not go unnoticed by the programmers in the two shops. In fact, Friday evenings at the Straightarrow Tavern sometimes got fairly exciting if a few of the crew from Alchemy and Softli showed up at the same time.

And it was one of those Friday evenings which led to the point of this story. Promptly at 4:43, a couple of car pools of Alchemy programmers drop by the Straightarrow on their way home from work. Properly dressed in their code-compatible dark gray suits and ties, they look with some disdain on a couple of bearded Softli folk nursing drinks in a corner, clad as they are in faded Wranglers and less than new Adidas.

The look does not go unnoticed, and one of the Softli group, who has been at the Straightarrow longer than is wise considering that he is scheduled for a 6 p.m. block of computer time, makes a derogatory comment about the coding skills and ancestry of Alchemy programmers in general and about this group in particular.

If the Straightarrow drew a factory crowd, fisticuffs might have erupted. But in the think-tank-type atmosphere of this particular tav, skilled and polished verbal violence broke out instead.

Before the battle was half warmed-up, Alchemy's dress code had been characterized as Hitlerian, Softli's standards as vacuous; Alchemy's working hours were attacked as beancounter-inspired, Softli's productivity as high but negative; Alchemy's structured programming was called proceduralized nits, Softli's working habits kindergartenish.

I'm not sure who it was who first suggested the code-off. I'm not even sure it was a good idea, in the long term. But as a battle stopper, it was a winner.

The idea clanged like a bell in the forensic uproar, and silence followed by enthusiastic negotiation over terms quickly subdued the crowd.

The idea was amazingly simple. It was one of those "My father is bigger than your father" numbers. It was a "put up or shut up" topper to all the other verbiage. It was "If you think you're such a good group of programmers, let's see if you can beat us."

By the time the assorted members of the two groups left the Straightarrow in their various directions that night, the ground rules had been set.

The code-off was simple enough. Two programs were to be designed and coded by two teams, one from each company. The first program was a report generator, relatively straightforward and unsophisticated. The second was a small precompiler for a language with a couple of complex data types and tricky semantics.

In last week's portion of this story, this cast of characters was introduced:

- *Stan Sorcerer, manager of software for Alchemy Chemical, who believes in running a tight, assembly-line-like programming shop.*
- *Herb Bond, Stan's counterpart at Softli Paper, who gives his programmers freedom to perform as craftsmen.*

Alchemy and Softli are neighboring corporations on the Straightarrow Turnpike in Open Spaces, Mass.

The question raised by Part 1 was, "Is it possible to decide which is better, the assembly line or craftsman approach to programming?"

Entities to be measured in the contest were the time to complete the program, the cost to complete the program and the quality of the finished program. Quality was subjective, of course, but the group negotiated a matrix of quality attributes to introduce some objectivity into the scoring and selected a team of scorers from each company.

Go to Your Corners and . . .

Four successive Saturday mornings at the Straightarrow were set aside for the competition; the Rose Bowl had nothing on the Straightarrow that series of Saturdays. Crowds from both companies packed the place, as word spread rapidly through both computing departments.

Some of the keypunch girls from Alchemy formed a somewhat impromptu cheerleading team, clad in matching and properly modest skirts and sweaters; a group of staff analysts from Softli used a portable CRT terminal to track the competition in realtime.

By the time the third Saturday had rolled around, the local ACM chapter had turned out en masse, and on the fourth Saturday reporters from the *Open Spaces Clarion Call* and the *Straightarrow Post* were there taking notes and pictures. It was the biggest thing to hit Open Spaces since Huricane Giselda.

The results of the code-off, in case you're waiting with baited breath; were an anticlimax. Scoring anomalies aside, it was a standoff. The Alchemy Assembly Liners had an easier time with the report generator and scored well in time and cost factors. But the Softli Craftsmen did better with the precompiler, and their quality scores were higher.

Which was perhaps a best-of-all-possible-worlds resolution, given the nature of the competition — nobody lost, and nobody felt bad as the crowd filed out of the Straightarrow that last Saturday, many of them three coding sheets to the wind.

Maybe Next Year

Sometimes, though, I wonder what would've happened if someone had really won. I mean, suppose you could really prove that assembly lining was better than craftsmanship. Or vice-versa.

Can you imagine Stan Sorcerer being wrong and letting his programmers come to work in sports shirts? Or Herb Bond being wrong and demanding that his programmers work an 8 to 4:30 shift?

Somehow, I'm glad the Henry Ford of software hasn't come forth yet. But maybe he'll show up at the Straightarrow next year — just in time for the second annual Open Spaces Code-Off.

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Despite Definition Differences

Users Reacting 'Very Favorably' to Relational DBMS

By Don Leavitt
Of the CW Staff

DALLAS — "Very favorable" reactions have been reported by many users of the relational data base management systems (DBMS) that have appeared in the past two years, Gerald Held of Tandem Computers, Inc. told attendees of a National Computer Conference session here recently.

Two users also on the panel tended to confirm Held's report. Nancy Goguen of Bell Labs, Murray Hill, N.J., described a New York Telephone Co. project based on the Ingres relational system developed at the University of California at Berkeley.

And Robert Westheimer of Arthur Andersen Co.'s Houston office told attendees about his company's work with the Magnum System from Tymshare, Inc.

But a fourth panelist — Frank Manola of the Naval Research Laboratory and a member of the Codasyl Data Description Language Committee — said he is still a skeptic on the real value of the new systems. The problem, he said, is that there is a very thin line between relational systems and more conventional data base systems.

And the differences might not be of value to everyone. They might even get in the way of truly effective use of the data base, he added.

Part of the problem in trying to determine how effective relational data base systems are really lies in the lack of a standardized definition of what constitutes a relational system. Held and Manola had differing definitions and emphasized the point by disagreeing on whether Magnum is in fact a relational system.

'Relational' DBMS

Held started the session by outlining the characteristics of a DBMS and then narrowed in on what makes some "relational." All data base systems include data models, a data description language and a data manipulation language.

Facilities supporting data security, data integrity, concurrent access and backup and recovery are also part of the picture, he noted.

A DBMS is considered relational if the data is viewed as entries in tables and if access to the data is through references to values posted in the tables, Held added.

There are, he said, at least six systems now in limited use: Ingres and Magnum; System-R and 'Query by Example" from IBM; PRTV, developed in the UK; Nomad from National CSS; Honeywell's MDBM for Multics systems; and DMS170 from Control Data Corp.

Goguen told the audience New York Telephone used Ingres on a dedicated Digital Equipment Corp. PDP-11 under the Unix operating system to build a data base system and an application in just three months in early 1976.

The flexibility inherent in not having to predefine the data relationships reduced both the design and implementation time, she said.

The development effort could be task-oriented instead of data-oriented, she continued, and even though a substantial conversion — from an IBM 370 to the PDP-11/70 — was required, it was worthwhile. The appropriateness of the relational facilities to the problem to be solved was one of its strong points, Goguen noted.

The need to create the relational links caused run time "penalities," she admitted, and there were some concurrency problems. Beyond that, the size of the data base has to be a consideration when evaluating Ingres.

With the PDP-11 environment, a very large data base with a wide range of domains "might be a real problem," she said.

Rapidity of Implementation

The rapidity of implementation and the system's adaptability to different customer needs were the strong point noted by Westheimer in his description of how Arthur Andersen implemented a tax return system utilizing Tymshare's Magnum.

However, he also noted the company made use of IBM's Hierarchy Input Processing Output documentation techniques and a data base administration effort, all of which "certainly helped, too."

In his critique of relational systems, Manola argued the fact there are relationships between certain data fields "is itself logical data" that should be clearly stated, as in conventional data base systems, and not just inferred, as in relational settings.

Relational systems often leave too much to the users, he continued. The users should be aware of what relationships are efficiently supported and which are not. They also should be taught which ones are meaningful, so they can be pursued, and which are "nonsensical."

Beyond that, he said, the concept of "naturalness" of relationships — one of the touted benefits of the new systems — isn't that clear a benefit. Naturalness is a subjective evaluation, he noted, and what is natural for one person may be very awkward for the next.

Cobol Installed on Sycor Series 400s

ANN ARBOR, Mich. — An interpreter now available for Sycor, Inc. 400 series systems provides users with standard Cobol facilities for application programs and linkages with the systems' CRTs for data entry support, according to a spokesman.

Sycor's Terminal-Interactive Cobol contains a subset of the American National Standards Institute (Ansi) specifications including support for all the normal divisions of a Cobol program, he said.

A range of file access methods as well as program segmentation, debugging and interprogram communication are supported.

Data entry requirements such as displaying formats for keying on the screen, accepting and editing data keyed by the operator and displaying data retrieved from a file or calculated by a Cobol program are available with Sycor's Cobol, the spokesman noted.

"Special capabilities" are said to be particularly helpful in the data entry environment. An alarm statement, for example, allows a programmer to sound an alarm when a keying error is detected or when a console message should be brought to the operator's attention.

The software and the system support dual-level intensity on the CRT so that important data can be highlighted in bright characters, for instance, while keying instructions and other prompting messages can be low-keyed.

Referring to classic Cobol facilities, the spokesman noted the software supports sequential, indexed sequential and random file organizations. Subscripting, numeric editing, figurative constants and "other basic Cobol language statements common in Ansi Cobol" are also backed by the compiler, he said.

The system software for the Sycor 400 line supports concurrent jobs or the running of the same data entry job at several CRTs. In the process, they can share disk-based master files and, through spooling, share peripherals such as printers and diskettes as well, he said.

Foreground/background support allow interactive jobs to run at the same time as batch production runs or compilations, he added.

The interpreter requires 14K of memory, can be used in a minimum 48K system and is free to interested Sycor 400 users. It can be ordered through Sycor's Marketing Services Dept., Ann Arbor, Mich. 48104.

'UCC Ten' Backs Documentation of IMS and OS

DALLAS — Enhancements built into Version 2.0 of UCC Ten, the data dictionary/manager from University Computing Co. (UCC), are said to enable users to completely document their IBM information Management System (IMS) and OS environments.

The documentation can range all the way from applications and specific jobs, programs and modules to data bases, communication networks and message format services, a spokesman claimed.

From these user-supplied definitions, the package can generate all IMS control blocks to include Stage 1 Sysgen and message formats, he added.

A password feature has been added to enhance security. User exits provided to implant this feature are described as similar to those already in place to enforce user naming conventions and standards.

A specialized data base for storing information about users, including passwords for the security feature, has been added to the system. By providing a place for such information apart from the definitions of the installation's actual data, the definitions need not be changed each time a password is changed, the spokesman noted.

Version 2.0 has also been enhanced to support 37 standard entity types that can be defined in UCC Ten; previously only 23 types could be handled. The keyword-in-context feature has also been extended, he said.

The release also contains support for IMS's Generalized Sequential Access Method, for all IMS-supported terminals including IBM 3790s, for Vtam and for the expanded message format, he added.

UCC Ten is available for $18,000 or for $700/mo for 36 months, the company said from 8303 Elmbrook Drive, Dallas, Texas 75247.

PCS Net Adds 'System 2000'

VAN NUYS, Calif. — Proprietary Computer Services, Inc. (PCS) has signed an agreement with MRI Systems Corp. under which PCS will shortly offer MRI's System 2000 data base management system on the PCS remote-computing network.

System 2000 is already in test operation on PCS' dual IBM 360/65s.

Twenty-one networks, including PCS, provide access to System 2000, a PCS spokesman noted from 16625 Saticoy St., Van Nuys, Calif. 91406.

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'Minimizing Redundancy' Implies Care, Common Sense

By Stephen L. Robinson
Special to Computerworld

Data Base Corner

I have received several letters dealing with topics contained in the first Data Base Corner [CW, May 2] and the two package selection columns which appeared earlier [CW, Feb. 14 and March 14].

It has been my observation, based on about 10 years of teaching experience, that if one person asks a question, numerous other probably want to ask the same question, but simply don't like to ask questions.

I therefore will devote space to responding to the two subject areas discussed in the letters.

A number of readers wrote in to argue for redundancy. They cited examples where standard applications would be rendered very inefficient by a requirement to extract data from files other than the present ones.

In response to these comments, all of which are quite valid, I would like to expand on the phrase "minimize redundancy" used in the Data Base Corner which prompted the readers' letters.

To minimize redundancy does not mean to eliminate redundancy. What was intended was to convey the elimination of unnecessary or unwarranted redundancy. Clearly a sense of balance must be struck between operational efficiency and the costs of maintaining redundant data.

Synchronize The Work

Two important points should be stressed:

- Where redundancy does exist, it should be synchronized. For examply, an employee's address change should be entered via *one* form and automatically used as an update transaction to all appropriate files.

Do *not* retain existing, separate change of address forms for separate applications. The opportunity for keypunch, transcription or simple data recording errors is multiplied several times over by the existence of multiple forms.

Once discrepancies exist on separate files, it is difficult to gather accurate interfile information, and it is also difficult — and expensive — to correct such discrepancies.

- In considering the costs of maintaining redundant data, do not simply attempt to balance the storage costs (of the redundant data) with the added processing costs (extracting data from multiple files for one report).

It is essential to consider the multiple maintenance runs and, if they exist (but see warning above), the multiple data entry procedures.

I hope the above clarifies by stand on redundancy. The elimination of data redundancy, while touted by many package vendors as a major reason for "going to data base," is usually not practical.

The reduction of redundancy and the synchronization of the remaining redundancy, is a major facet of data base system design.

'Yes' to Minicomputers

Several readers asked whether or not data base systems could be built on minicomputers.

In point of fact, a data base system can be designed based solely on manual files. The size of a computer system is "only" a problem when dealing with large data bases and/or large teleprocessing networks.

To answer the question more directly, yes, data base systems can be constructed on minicomputers. To assist in this endeavor, vendors (hardware and software) are releasing an ever-growing list of data base packages which run on minicomputers.

For example, variants of Cincom Systems' Total and Cullinane's IDMS are available on a number of minicomputers: Hewlett-Packard, Digital Equipment Corp., Varian and Interdata, to name but a few. In addition, many customized data management packages exist for specific hardware.

If I had a crystal ball in which to gaze, I would anticipate seeing a substantial growth in the use of minicomputer data base systems, especially distributed data base systems.

Not that this will happen overnight. It will probably be the early 1980s before data base package sales on minis overtake sales on maxis.

Back-Ended to 370

Many of the minicomputer data base packages will probably be in support of applications running on maxis. Cullinane is presently developing a version of IDMS which runs on a DEC PDP-11 mini "back ended" to an IBM 370 mainframe.

The intent of such a configuration is to free the mainframe resources for application work, not data base package work. Clearly the data base environment will determine the effectiveness of such a configuration.

Cullinane is working with several government organizations on the development of this concept. Presumably the development process will include some quantification of the cost effectiveness of the back-end system in different environments.

This would assist data base novitiates in assessing the best route for them to take in traveling the data base road.

And in the wonderland of data base packages, front-end and back-end systems, teleprocessing packages and other data base miscellany, we can use any and all quantitative guidelines.

Copyright Stephen L. Robinson, 1977

'Hasp/32' Connects IBM, Interdata CPUs

OCEANPORT, N.J. — The Interdata Hasp/32 package was designed to enable users of Interdata, Inc. 32-bit computers to emulate IBM Hasp workstations while satisfying their local processing needs.

The software allows users to submit batch jobs from the Interdata unit to an IBM host computer over a binary synchronous communications line. Hasp/32 executes as a user task under Interdata's OS/32-MT operating system in conjunction with the Interdata Telecommunications Access Method (Itam), according to a spokesman.

The package supports up to seven card readers and eight printing devices, a control console and dial-up or leased lines operating at speeds up to 19.2 kbit/sec. Seven job streams in each direction are allowed, the spokesman added.

The workstation software is available in object form and costs $1,740 on 7- or 9-track magnetic tape; $1,930 on a 2.5M-byte disk; or $1,970 on a 10M-byte disk. These U.S. prices include installation and documentation, Interdata said from 2 Crescent Place, Oceanport, N.J. 07757.

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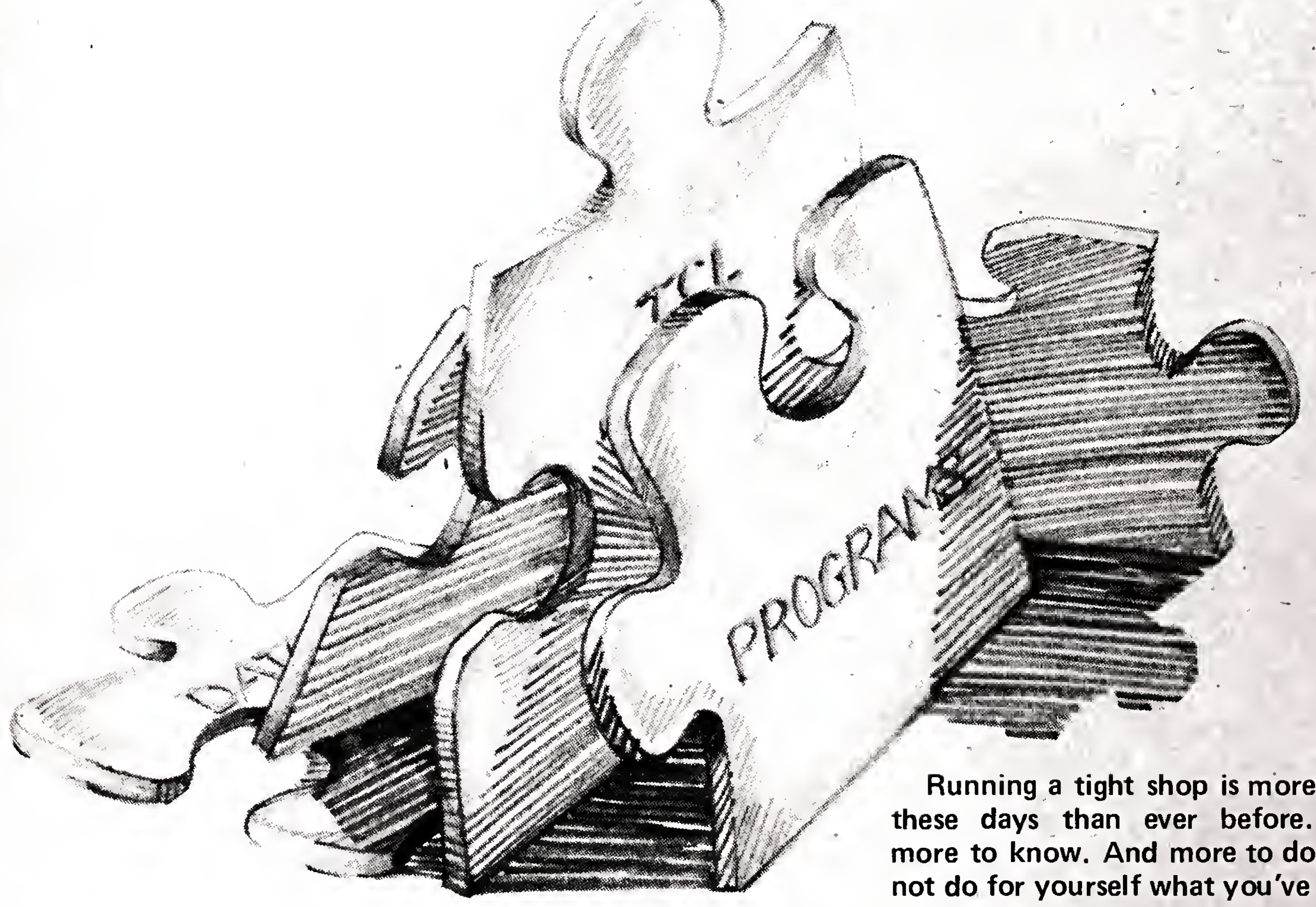

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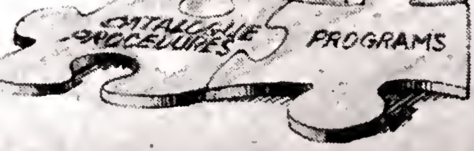

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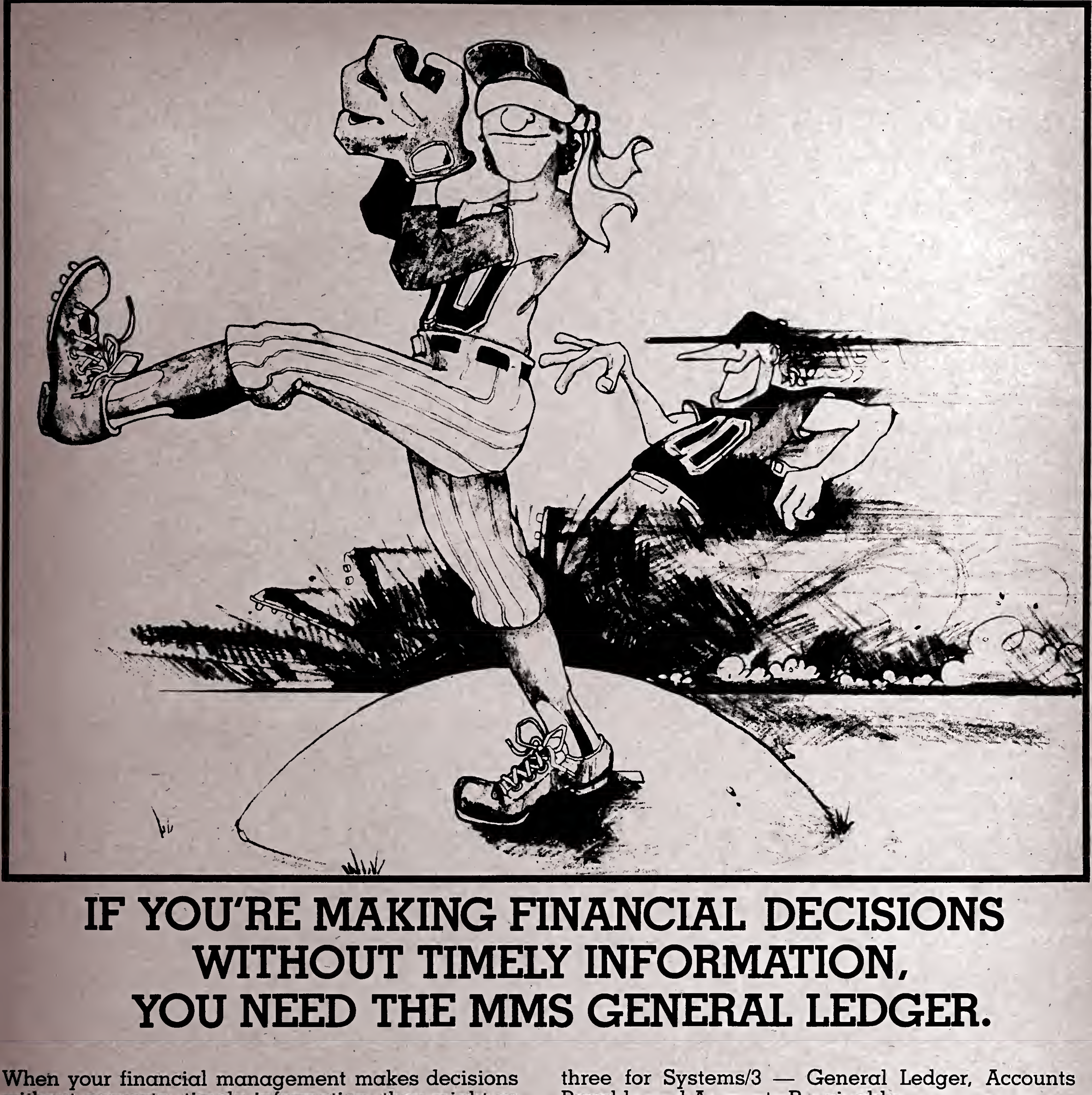

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Nothing Mandated, But . . .

ACM Programmer Curriculum Sets College Guidelines

J. Daniel Couger On Education

Recommendations for an applications programmer curriculum were published this week in the Association for Computing Machinery's (ACM) *SigCSE Bulletin.* The associate degree program was developed by the five-person subcommittee for community and junior college curriculum in computer science, headed by Joyce Little of Baltimore Community College.

The committee's report culminated two years of effort involving more than 60 persons from both two- and four-year institutions.

Perhaps the most unique feature of the report is the absence of a model program for curriculum coordinators to use as a guide to implementation. The committee decided instead "that no one structure could be designed that would suit all community and junior colleges."

The report urges each institution to "design its curriculum and the courses within it to fit its own mission and philosophy, the characteristics of its student clientele and the characteristics of its commercial environment." The committee provided a list of 160 curriculum topics rather than a set of courses. It also identified important prerequisites and non-DP subjects to be covered.

General Requirements

A 60-credit hour program was recommended, with at least 24 hours in computer-related subjects. Five subject areas were identified:

(1) The computer-related topics.

(2) Local-option computer-related requirements and electives.

(3) Minimal English, mathematics and business.

(4) Electives for an emphasis in an applied field.

(5) Institutional and state general education requirements.

The required computer-related content was classified into two major areas, (1) principles and techniques of programming and (2) programmer environment. The first stresses in-depth programming knowledge, techniques and skills "supported by training in problem solving and logical analysis which facilitate optimum organization of the data and program for computer solution."

The second includes fundamental concepts of hardware and software plus organizational, social, psychological and economic matters which make up the environment of the programmer within the analysis, design, implementation and operation phases of an applications project.

Twenty-three topic areas are listed under the computer-related materials, with a total of 160 subtopics. The reader can get an appreciation for the level of depth by examining the subtopics under the topic heading "Quality Programming with Structured Approach:"

- Fundamentals of structured analysis and design of programs.
- Top-down programming/debugging/testing/implementation.
- Analysis of a program's structure for improvement: efficiency, style.
- Review of control structures.
- Determination of logical equivalence of two differently written programs.
- Comparison of efficiency of two differently written programs: execution times, storage requirements, programming time, maintenance time, etc.
- Conversion of unstructured code to structured code.
- Effect of program language in structured programming.

Language Controversy

The question of RPG vs. Cobol was hotly debated within the basic subcommittee and at review meetings with other interested persons. Ultimately the committee included the recommendation that the student be required to take both Cobol and RPG and also an assembler language.

The graduate of the program, in addition to being skilled technically as a computer programmer, "must be able to use communications skills and related talents to work in an organization responsibly, effectively and productively." Subject matter content "must therefore include material to assure proper written and oral communication, fundamentals of mathematics and statistics and knowledge of organizational matters and information flow within a company."

Minimum math competency would consist of a two-course sequence: finite mathematics (including set theory and logic, probability, permutations and combinations, series and sequences, functions, linear equations and matrix notation) and elementary noncalculus-based statistics (including use of elementary statistical packages).

Students who had these topics in secondary school should choose more advanced courses, such as advanced algebra, differential and integral calculus and linear algebra, the committee suggested.

The report also includes suggestions on qualifications for the instructional staff, the minimal level of computing resources and types of interaction with community.

Copies of the curriculum recommendations are available from ACM, 1133 Ave. of the Americas, New York, N.Y. 10036. Ask for the June issue of *SigCSE Bulletin.* The cost is $4.

Couger is professor of computer and management science at the University of Colorado.

HIS Updates Data Query System, Supports 6000 Series, Level 66

PHOENIX — Improved end-user facilities for retrieval and reporting of data controlled by data base management systems (DBMS) and other file access methods are said to highlight enhancements to Honeywell Information Systems, Inc.'s Management Data Query System (MDQS) software.

The upgrades, designated MDQS/II and MDQS/IV, are now available to users of HIS Series 6000 and Level 66 large-scale systems, a spokesman noted.

MDQS/II "greatly increases" the previously offered MDQS as an end-user facility with a data base retrieval and report generation system, he said MDQS/IV offers these capabilities plus data base creation and maintenance features, he added.

Simplified conversational commands and procedural statements appear to be the key to the software enhancements. A data base can be created through the MDQS procedure language or a compiler-language program; MDQS, in turn, can use subroutines written in other languages to manipulate data, the spokesman noted.

With such capabilities, a user may be able to solve "a broad range of problems" without file conversion or special languages, he said.

Access to data managed under HIS' Integrated Data Store (IDS) DBMS, indexed sequential processor and associated sequential files is available, he added.

Maintenance facilities enable users to retrieve, modify and place data back in the data base, to update multiple data bases from multiple transaction files and to write or read auxiliary files. The creation of a data base that is a subset of another, the combining of two or more data bases into one and the splitting of one into several are also possible with the MDQS software, the spokesman said.

Other MDQS enhancements are a user-profile subsystem, subscripting, table lookup, support for removable media, data validation and large record processing.

MDQS/II is available on a monthly license for $520 and MDQS/IV is available on a monthly license for $908; further information is available from the HIS Inquiry Center, 200 Smith St., Waltham, Mass. 02154.

Card Helps Debug CICS Routines

NEW YORK — A pocket-sized guide to IBM's Customer Information Control System (CICS) from Telecommunications Technology Corp. (Teltech) is said to enable the CICS programmer to review the system "with step-by-step guidance in the complex relationships between the various CICS control blocks."

Designed for the VS environment, the card supplements the guide Teletech published earlier to support DOS/Standard and DOS/Entry users. The card is said to introduce specific methodology for solving the most often encountered Abend conditions.

The guide provides a comprehensive analysis of internal problems which may be encountered in a CICS environment; solutions to those problems are presented in a concise format, a spokesman claimed.

It is divided into four interacting elements: debugging hints, CICS Control fields, Trace Table Analysis and Dump and Abend codes, he said.

The cards are available for $3 each for the first four copies. Postage and handling charges of an additional 75 cents are waived if the order is prepaid, the company said from Suite 303 East, 200 Park Ave., New York, N.Y. 10017.

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Man-Machine Study Finds

Faster Terminals Hindering Operators' Performance

By John P. Hebert
Of the CW Staff

DALLAS — Faster is not necessarily better — and could be worse, at least as far as CRT terminals and their operators are concerned, a recent study presented here found.

Lawrence Miller of Xerox Corp. in El Segundo, Calif., told attendees of a National Computer Conference session on the "Man-Machine Interface" that users don't get any greater value or performance from a 2,400 bit/sec terminal than they do from one that operates at 1,200 bit/sec.

The reason for this, according to Miller, is that the greater output variability on the higher speed terminal may actually have the effect of decreasing the performance of a terminal operator working in an interactive environment.

The implications for other terminal characteristics and parameters such as screen size, lighting and type of character generation may be wide-ranging, his study indicated.

Those who work with computer systems in general and who interact intimately with the systems' components are constantly getting feedback that changes operators' way of looking at the system, Miller said.

Miller and others at the Information Sciences Institute (ISI) performed a study of CRT operator performance parameters in an interactive message retrieval system. The system consisted of a Digital Equipment Corp. PDP-10 CPU and a Hewlett-Packard Co. CRT/keyboard terminal.

Subjects were tested along three experimental parameters: the output transmission rate from the terminal; low and high output rate variables; and different output volumes, either less or greater than 1,000 characters per interaction.

Using methodology incorporating techniques from experimental and cognitive psychology, Miller found output variability — in this case the response time for receiving a full message — was the crucial factor.

Increasing the variability of the output display rate, Miller told attendees, significantly decreased operator performance and promoted a poorer attitude toward the system and the interactive environment.

CW Photo by A. Dooley
Lawrence Miller

The generally held notion that increased output display rates are associated with better operator performance is therefore incorrect, he concluded.

The importance of this study and other studies into the man-machine interface can help predict operator performance. The long-term implications, he continued, show intuitive ideas can be replaced with solid, reliable data.

In a later interview, Miller said single-screen computer terminals may be joined in the future by multiscreen displays mounted in desktop configurations.

This type of display format could replace existing large-screen, large-capacity displays or split-screen displays in applications requiring the display of a large amount of segmented data, according to Miller.

A terminal operator would sit at a multidisplay console and interact with a number of displays containing varied information fields, he said. Each separate screen would have a capacity of less than 1,000 characters, allowing an operator to interact with important information more readily and easily.

The results of another probe into the man-machine interface has already found its way into the Univac product line, according to

(Continued on Page 20)

Tymshare Spokesman Notes

Tymnet Switching Differs From Other Packet Nets

By Ronald A. Frank
Of the CW Staff

DALLAS — Compared with other packet networks, the Tymnet network contains some significant differences that have never been fully documented in the literature, according to John Kopf of Tymshare, Inc.

Tymnet was originated to handle the in-house needs of Tymshare, but it later evolved into a network to serve outside users. It now operates as a common carrier, Kopf told session on international networks at the recent National Computer Conference here.

Tymnet, he explained, is a virtual circuit-switching net which includes three types of nodes — the Tymsat, which contains an interface for low-speed asynchronous dial-up traffic; a base node, which includes interfaces to Tymshare's Xerox XDS-940, Digital Equipment Corp. Decsystem-10 and IBM 370 CPUs; and the Tymcom, which is similar to a base node but interfaces to a larger number of CPUs.

The supervisor program maintains control over the network and manages network resources. It operates on an Interdata 7/32 minicomputer on several nodes in the system that are capable of net control functions.

Tymnet uses a line protocol which has less overhead than other packet nets while also providing flexibility, according to Kopf.

The basic unit of data within the network is a character or byte of 8 bits. These bytes are transferred on fixed-path circuits within the system; a stream of bytes is transmitted over a circuit maintaining the original sequence of the bytes, Kopf said.

The Tymnet data packet contains a 2-byte header, 3- to 60 bytes of information and a 4-byte checksum at the end of the packet. Since the packets are of variable length, fill characters are not transmitted. Each line is assigned a fixed number of channels and, on a given line, a circuit is assigned to one channel.

At the end of the line, a pair of buffers is assigned to a circuit for the duration of the circuit. The channel and buffer assignments are made by the supervisor at the time the circuit is established, Kopf said.

Each node along the circuit is also informed; in this way, line overhead is lowered because complete routing data does not have to be transmitted along with each packet, he explained. Each circuit is terminated at both ends by connection to an interface called a port.

A physical packet is subdivided into one or more subpackets, or logical records. Each logical record contains two header characters that specify the channel number and the number of data characters present.

This scheme allows the multiplexing of a number of short messages into a single packet. With this method, individual logical records do not require the overhead of checksums, Kopf said.

Circuits are set up or built at the request of a network user; a circuit can be built to a base node, but it can originate at either a Tymsat or a base, he added.

A network circuit can operate in an unbuffered mode, during which the input rate equals the output rate, or it can operate in buffered mode, which means data can be accepted at a faster rate than it is output by the circuit, Kopf said.

The average ratio of input to output is controlled by a "back-pressure" mechanism which manages orderly flow control on the circuit, he noted.

The Tymnet network has been in operation since 1971 and it has now evolved into a 200-node system, Kopf said.

Intelligent Terminals Have Heyday at Recent NCC

By John P. Hebert
Of the CW Staff

DALLAS — Introductions of compact intelligent terminals from a number of vendors satisfied visitors' new-product appetites at this year's National Computer Conference.

These products comprise an impressive list when combined with the standard terminal offerings found on the exhibit floor [CW, June 20].

Digi-Log Systems, Inc. unveiled an integrated desktop workstation with minidiskette storage as well as an electronic store process-and-forward communications system at the conference.

The Microterm II source data entry workstation was designed for DP service companies, large end users and OEMs. It has a 1,920-character CRT, an optional integrated 2,200 char./sec nonimpact rotary printer, single or optional dual mini-diskettes and two microprocessors with 16K- to 48K bytes of random-access memory (RAM) storage.

Applications software to run with the terminal system's interactive disk oeprating system can be programmed in Extended Basic or the Z80 microprocessor's Assembly language and debugged from the Microterm keyboard, according to a Digi-Log spokesman.

The compact terminal can communicate synchronously or asynchronously at speeds up to 9,600 bit/sec. It supports Bell 201, 202 or 103 or equivalent modems and has RS-232C and CCITT interfaces, the spokesman noted.

Digi-Log's Microcomm has essentially the same standard and optional features of its look-alike Microterm-II counterpart, but additionally includes the utility capabilities needed to generate, assemble, manage, transmit, mailbox and recall messages, according to the firm.

The Microcomm data entry and communications-oriented workstation offers half- or full-duplex communications at speeds up to 9,600 bit/sec in user-selectable protocols, including the CCITT's X.25 pro-

(Continued on Page 20)

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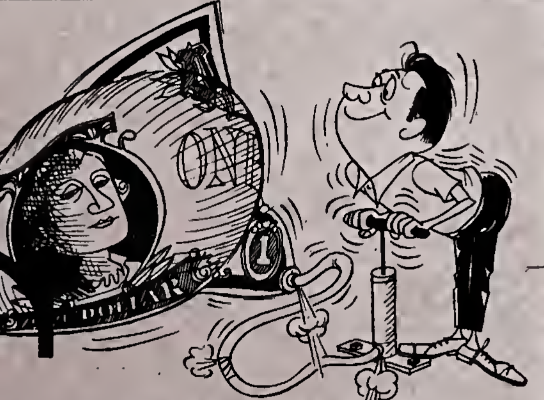

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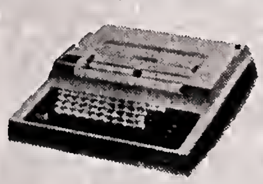
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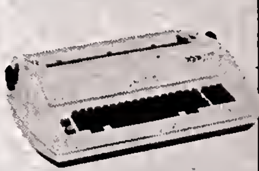
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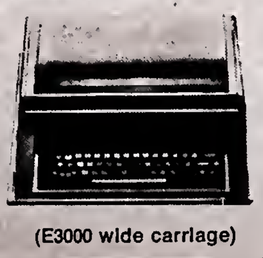
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Time-Sharing Firm Eliminates Errors With TDM Upgrade

By John P. Hebert
Of the CW Staff

STAMFORD, Conn. — A computer services company, which has a computer center here tied to London, recently upgraded its multiplexers to eliminate transmission errors and concentrate more input lines.

The National CSS, Inc. (NCSS) leased-line network allows access on a local dial basis to 75 cities in this country in addition to service to England, according to Joe Wakin, the firm's manager of communications.

The NCSS London/Stamford link operates at 9,600 bit/sec and is split by Codex Corp. modems into one 4,800-and two 2,400 bit/sec channels, Wakin said.

The two 2,400 bit/sec data streams serve intelligent terminals in London which are capable of coping with transmission errors. However, higher-speed channel serves subscribers who use Teletype Corp. machines and 110- and 300 bit/sec Teletype-compatible terminals, IBM 2741s and equivalent devices, which have no means of detecting and correcting errors, he added.

NCSS already had Timeline 240 time-division multiplexers (TDM) from Infotron Systems Corp. on the international link. To eliminate errors, the time-sharer upgraded the 240s to Timeline 780 Supermuxes which are microprocessor-controlled devices, Wakin stated.

Data is temporarily stored, checked for errors and retransmitted, if necessary. Buffers in the multiplexers have sufficient capacity to ensure no data is lost — even with outages lasting as long as 10 seconds on a loaded 9,600 bit/sec line, he said.

An NCSS spokesman also said the firm is able to concentrate more input lines over the same 4,800 bit/sec link because the intelligent TDM transmits only active inputs. The time-sharing vendor is also taking advantage of the reporting capabilities for special systems studies, he said, adding the reports detail any retransmissions, buffer activity and line utilization.

The NCSS traffic to London goes to New York City first, then over French cable to London where the British Post Office completes the link to NCSS' office. French Cable has the end-to-end responsibility for maintaining the link, the spokesman noted.

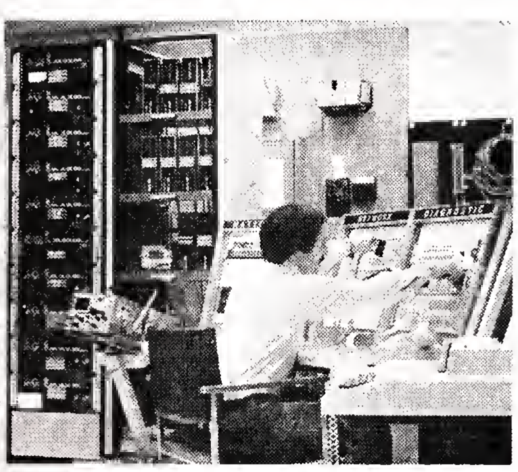
NCSS initially installed the Inforon Timeline 240s, Wakin said, because the company liked the physical aspects, engineering and diagnostics and the ease of troubleshooting the network.

NCSS has more than 50 of those TDMs, which are used to help cut communications costs by concentrating more than 750 slow-speed inputs over 25 higher-speed Digital Data Service (DDS) Lines from AT&T, for the most part, Wakin said.

The NCSS network provides about 10,000 users worldwide with the ability to access their data bases stored in one of NCSS' three main computer systems — an IBM 370/168 and an Amdahl Corp. 470V/6 in Stamfrod and another 370/168 in Sunnyvale, Calif.

Each CPU has Digital Equipment Corp. PDP-11/40 minicomputers or Memorex Corp. 1270s acting as communications controllers; and DEC machines are used in the NCSS network as concentrators in New York, Philadelphia, San Francisco and other cities, the spokesman noted.

The PDP-11 front ends and more than 20 concentrators use Infotron PI510s for the asynchronous line interfaces, he said, adding the interfaces accommodate up to 16 I/O channels with transmission rates up to 9,600 bit/sec.



An NCSS technician at the diagnostic center tests line parameters on a network link.

Intelligent Terminals Have Heyday on NCC Floor

(Continued from Page 19)

tocol, the spokesman stated.

The Microterm II with the optional rotary printer costs about $8,000 and the Microcomm communications workstation is priced between $9,000 and $10,000, including applications software.

Digi-Log is located on Babylon Road, Horsham, Pa. 19044.

Wavetek Data Communications of San Diego, Calif., introduced a microprocessor-based CRT terminal which reportedly operates on dial-up lines and receives both displayed and audio data through a telephone handset.

Designed for bank environments with inquiry/response applications, the Waveterm Model 1100 utilizes a standard Ascii character set and can display 256 characters in eight lines by 32 characters.

The unit includes control keys for cursor movement and has an autodial feature that allows two frequently used phone numbers to be called up by dialing only one or two digits.

The Model 1100 can be used with credit authorization systems as a replacement for phones now operating with audio response units. The display capability allows the operator to call up an entire customer credit record when necessary, a spokesman noted.

The Model 1100 was described as part of a complete system. A card reader will be added in several months, and a printer and personal identification number (PIN) pad will follow later, the spokesman said.

The Model 1100 is scheduled for first deliveries in October and will cost $1,990. The card reader will cost $400; prices for the printer and PIN pads have not yet been set.

Ann Arbor Accents

Ann Arbor Terminals, Inc. announced a microprocessor-based keyboard send/-receive CRT terminal with character accents as a standard feature.

The Model 400 also has a scrollable memory, a full Ascii keyboard with cursor controls and teletypewriter compatibility. It can communicate at speeds from 110- to 9,600 bit/sec in half-or full-duplex modes and has an RS-232-compatible interface, according to an Ann Arbor spokeswoman.

The standard Model 400 with upper case characters and standard character accenting will cost $1,470. Information on the terminal's availability can be given by Ann Arbor, 6107 Jackson Road, Ann Arbor, Mich. 48103.

Volker-Craig introduced its VC403A and VC424 CRT terminals. The 403A is a Teletype-compatible terminal with a detachable keyboard and 1,920-character screen capacity.

Asynchronous transmission rates from 110- to 9,600 bit/sec are switch-selectable on the basic terminals, according to a Volker-Craig spokesman.

The VC424 is a microprocessor-based, upgraded counterpart to the VC303A, the spokesman noted. Priced at $1,750, it is also compatible with Digital Equipment Corp.'s VT terminal series, he said.

Voker-Craig is located at 266 Marsland Drive, Waterloo, Ont., Canada N2J 3Zl.

Harris Data Communications Division, Nashua, N.H., demonstrated an engineering model of a large-screen 8180 display format which duplicates a similar feature recently introduced for members of IBMs 3270 terminal series.

The 3,400-character screen capacity is displayed in a 80-column by 43-line arrangement. The capability reportedly will be introduced within a year, a spokesman said.

MFE Expands 5000 Capabilities

SALEM, N.H. — MFE Corp. has expanded the communications and storage capabilities of its MFE 5000 buffered data cassette terminal.

All of the upgraded intelligent terminals include a Model 202 modem controller which can be used with Bell-type 202C, 202D, 202S or 202T data sets to achieve transmission rates up to 1,800 bit/sec, the company said.

Line turnaround for the 202 modem controller can be selected and auto-answer capabilities for unattended operation along with the user's answer-back are also part of each 5000 terminal, the company stated.

The operator can manually select either 860 or 138-character block lengths. In addition, the storage of the terminal has been increased from 175,000 characters of formatted data up to 221,000 characters.

The terminal includes read-after-write, cyclio redundancy check and parity checking features; asynchronously transmits data in half- or full duplex modes and in serial form; and offers six switch-selectable transmission speeds from 110- to 2,400 bit/sec.

The terminal costs $1,995, from MFE at Keewaydin Drive, 03079.

Faster CRTs Not Better: Study

(Continued from Page 19)

another session panelist, James Black, who worked at the Sperry Research Center in Sudbury, Mass., developing Univac's general-purpose dialog processor.

The dialog processor is a "human input and machine output processor" that has been incorporated into Univac's recently introduced BC-7 small business system, according to Black, who now works at Science Applications, Inc.

The processor, he said, is a hardware/-software interface between the terminal and the host processor. It is an interpreter of encoded dialogs and is a syntax-driven device.

It was developed because of "a conflict with human communications compared with [computational] machines' rigorous communications." It is a natural language processor which makes machine interaction comfortable for the operator, he said.

Complex Questions

The processor asks the terminal operator a complex series of questions to generate the application operating parameters. A structured dialog editor reruns the operator's natural language commands through the editor to change the file format and synthesize a new output, Black explained.

The importance of the dialog processor, according to Black, is that it enables dialogs to be designed separately from the host processor's operating structure and can be tuned to user needs.

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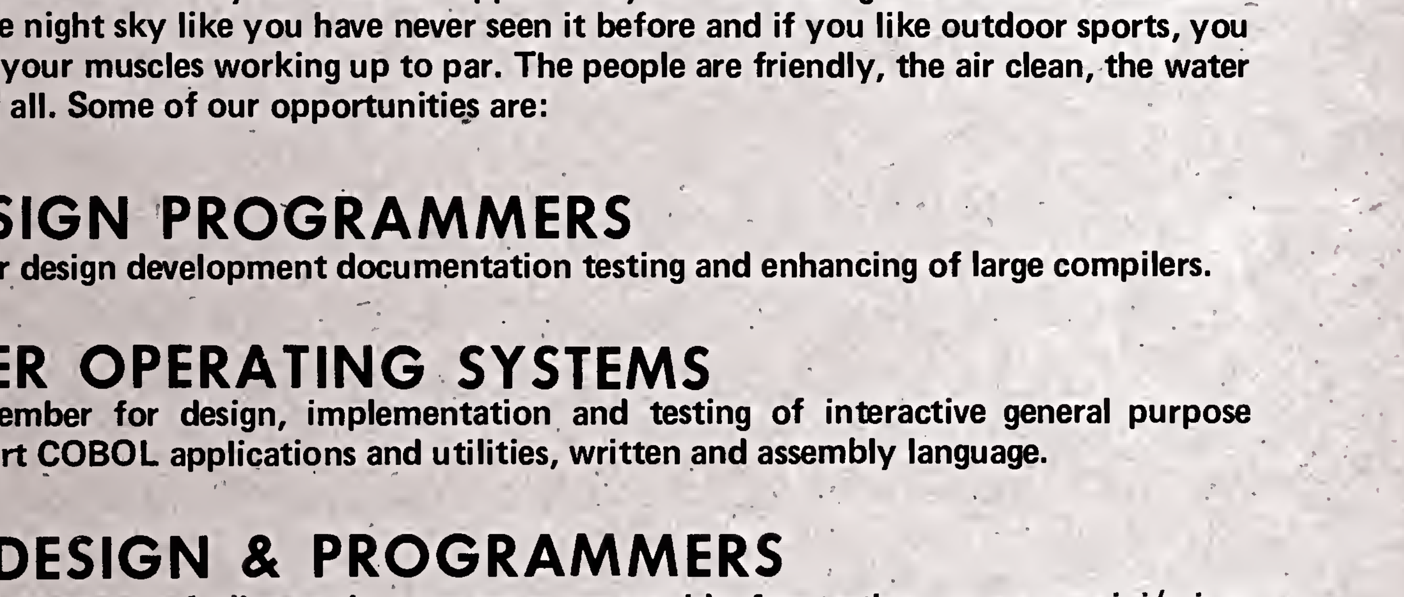

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'Computercation' Called Future Decision-Making Reality

By John P. Hebert
Of the CW Staff

DALLAS — The marriage of computers, DP and communications networking is slowly becoming a reality in the computer world.

And "computercation," as it is called, will depend on networked minicomputers and microcomputers in the future, according to Susan S. Poh of Mitre Corp., who chaired the National Computer Conference session on "Applications of Computer Networks" here recently.

The future importance of networks will be to allow a facility for distributed decision making and control, Poh said as she introduced speakers presenting papers on network services comparison and structured computer conferencing.

Ultimately, users will need a network operating system that is transparent to the user in processing the details of the network, according to Sandra Mamrak, assistant professor of computer science at Ohio State University.

Networks presently provide the potential for resource sharing, but are inhibited by the limited range of available services in addition to the lack of a practical method of data translation between the user, machine and machine languages, Mamrak told session atendees.

Specific user needs, she said, include networkwide accounting capabilities, security precautions, network status information and network interface assistance where there are multiple processors available.

In keeping with these ideas, Mamrak presented a paper on "Comparing Equivalent Network Services Through Dynamic Processing Time Prediction," written by Mamrak and Stephen R. Kimbleton, an associate at Ohio State University.

In their study of comparative resource information sharing, the authors implemented a method of finding and manipulating response time variability between a Digital Equipment Corp. Decsystem-10 and a Univac 1108, both located within the same distributed processing network.

The prediction method accounts for the network variables of concurrent workload, operating system queues, the physical mechanics of different peripheral devices and a reporting mechanism for response time details in a dynamic environment, Mamrak said.

The researchers used NBS's Micro Benchmark — a software tool — to determine the network response time. They predicted the response time from both the DEC and Univac CPUs 75% of the time with an error factor of 20% or less, according to Mamrak.

The advantages to the dynamic approach of micro benchmarking response time, she said, are that there is a greater sensitivity to system variation than with passive means and implementation overhead is low.

Disadvantages to the approach are that length of the benchmark run can be up to seven seconds in some cases; the micro benchmarks don't reflect real work in the system; and the approach hasn't been tested in different types of networks and computer systems, Mamrak pointed out.

Telemeetings Seen Overcoming Barriers

DALLAS — Although face-to-face communications is the most natural form of human interaction, the alternative of computer conferencing is becoming increasingly more attractive for overcoming the barriers of space and time, according to a speaker at the recent National Computer Conference here.

Computer systems and communication networks can be used as buffers of non-real-time conferences in the capacity of bulletin boards with messages, according to Stephen H. Unger, professor of electrical engineering and computer science at Columbia University.

George W. Arnold of Bell Laboratories, worked with Unger to develop a structured data base conferencing system called the Computer Buffered Information Exchange (CBIE), now in operation at Columbia University's Information Center.

With such a message system, Unger said, meetings can be ongoing processes which effectively eliminate "mismatches of people's desires" and promote conversational replies on a parallel basis because of the independence of spatial and temporal factors.

The major disadvantage, is that such a system eliminates the leisurely discussions and other characteristics of social situations, Unger said.

The CBIE system is based on a Digital Equipment Corp. PDP-11/50 with 100K bytes of main memory, a fixed-head swapping disk, a moving-head file storage disk, and DEC's RSTS time-sharing system, according to Arnold.

CBIE is programmed in an extended version of Basic, he added.

Added Sophistication

The system provides the user with greater sophistication in perusing conference proceedings, Arnold said.

But improved implementation, graphics and the inclusion of voice capabilities are also needed to make such a system more complete and useful, he added.

In citing the disadvantages of impersonality and the fact that "people don't like to type," Arnold said technological improvements in voice capabilities and programming would counter those disadvantages.

A major advantage to such systems, Unger contended, is to filter out human emotions. The interaction with other people through computer terminals in writing "tends to cool things off a bit.

"We wrote letters at one time," Unger said, countering an attendee's argument that emotion is a necessary part of communication. "You don't blab as much in a letter," he explained, adding computer teleconferencing is not a replacement for face-to-face needs, but is good for situations limited by space or time.

Another advantage is that the delayed teleconference attendee "doesn't have to read somebody's full text," whereas face-to-face in a formal meeting, he would be obligated to do that, both Unger and Arnold agreed.

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Multiple Processors Seen Enhancing OCR Applications

By Ronald A. Frank
Of the CW Staff

DALLAS — Applications which show the most promise for optical character recognition scanning (OCR) include credit authorization, banking, postal uses, government health care and retail department store transactions, according to Herbert Schantz of the Optical Character Recognition Users Association.

Calling OCR a "mature technology," Schantz chaired a session at the National Computer Conference here recently that described the application of various technologies to OCR systems. David J. Bastyr, an engineer with Recognition Equipment, Inc. outlined an interprocessor communications discipline for OCR applications using multiple processors.

The data handling rate is the key factor in determining the amount of available time to process information before the next scan occurs, Bastyr said.

He described a system using dual processors controlled by an interprocessor unit (IPU), explaining that a processor must gain control of the interprocessor channel before it can initiate an interprocessor transation.

Interprocessor transactions can consist of three types: single-word transfers, block input transfers or block output transfers.

Single-word types are used when a message can be contained entirely in one word. A block transfer is used when multiple word messages are sent from a slave processor to the master processor.

A block input discipline is used when data is transferred from a slave processor to a master processor. A block output discipline is used when data is transferred from a master processor to a slave processor, according to Bastyr.

The master/slave relationship is established by the IPU, which determines that one of the processors will be the master and will control transmission on the interprocessor channel, Bastyr said. Other processors then are designated as slaves to the master.

Using the nondedicated system described by Bastyr, the master/slave relationship is established at the time a transaction is initiated. An interprocessor supervisor provides the software required to maintain an orderly flow of transactions, he said.

The nondedicated interprocessor discipline was developed for multiprocessor applications involving the distributed processing of asynchronous real-time events handled at high speeds.

Signature Image Compression

David Himmel, director of research at Recognition Equipment, described a system of signature image compression by which a signature could be transmitted across town to a bank, retrieved from a disk file and displyed on a CRT terminal "within a period of one second."

This signature storage and retreival is comprised of a composer subsystem, storage subystem and display subsystem, he said.

The composer subsystem contains an optical scanner and a data compression unit.

This unit would "lift" an example signature from paper and compress it into compact digital form. A digital matrix of 128 by 512 cells is created and this 65K bits containing the original signature is then encoded into an average of about 2,500 bits, he added.

The 2,500 bits are stored on a disk subsystem for later retrieval. The storage subsystem contains the disk and a processor that accepts requests for signatures retrieves the stored data and transmits the compressed signature data to the correct CRT terminal where it is displayed by the display subsystem, Himmel stated.

A signature request can be made using dial-up lines by entering information such as an account number or credit card number into the keyboard of the terminal.

When the stored signature is displayed on the CRT screen, the operator can determine its validity by comparing with the signed document prepared by the customer, he added.

'Cashaction' On-Line DP Service Allows Customers to Pay Bills via Telephone

OMAHA, Neb. — Paying bills by telephone may sound like a sophisticated system for up-to-date giant corporations, but average citizens with modest bank accounts here are using the same program.

Customers of the Commercial Federal Savings and Loan Association here and in outlying areas can pay as many bills as they wish simply by using "Cashaction" telephone lines. A call arranges direct and automatic payments to any company in the U.S. with checks issued immediately or delayed up to 30 days after the call. Using the same line, customers may transfer funds to or from checking and savings accounts or withdraw cash.

"Cashaction is a big step toward checkless financial transactions and lends powerful support to electronics fund transfer concepts, but its major contribution, we feel, is the new dimension of convenience it extends to our customers," William A. Fitzgerald, Commercial Federal's president, said.

"A customer can now handle bill payment from his home or office anywhere a telephone is handy any day of the week, at any time from early morning until late evening, with no checks to write. We expect big things of Cashaction and from a related service, called "Cashflow," that offers similar bill paying and funds transfer convenience to our commercial customers," he added.

The Cashaction program is handled by the association's IBM 370/135, which maintains the customer account records, and a small IBM System 7, which acts as the interface between the 135 and the telephone.

"We brought in the System 7 to furnish the flexibility we needed to make Cashaction practical from the service and cost standpoints," according to Keith R. Thomas, vice-president and director of data processing. "It functions as the intermediary between the customer on the telephone and the account records in the central computer. It provides audio response capability to quickly inform customers of their account status, tells them the procedures to follow and confirms the customer's instructions regarding bill payment or fund transfer."

No Limit to Bills

In order to establish a Cashaction account to pay bills, the customer lists retail stores, business firms and individuals where charge accounts are maintained or payment obligations will most likely occur. Routine payments for mortgage, auto loans and insurance premiums also are listed. There is no limit on the number or type of bills the customer can list, and additions or deletions may be made at any time.

A "vendor" number is then assigned by the bank to each payee on the customer's list, and the list becomes a part of the customer record maintained on the 135. Deposits to Cashaction accounts can be made by mail, by telephone or in person at any of Commercial Federal's 25 branch offices in Omaha and nearby communities. A major advantage for customers is that the funds earmarked for paying bills earn interest until they are actually withdrawn for payment.

To initiate a Cashaction transaction, the customer phones the association and tells the system who to pay, how much and when the payment is to be sent.

Then the System 7 records the identity numbers of the vendors to be paid, the amounts and payment dates. Finally, the vendor numbers, payment amounts and dates are confirmed by voice response.

Association officials estimate that more than one-half of the Cashaction transactions will involve direct 12-key Touch-Tone phone/audio response computer communication. They expect this percentage to increase steadily as the 12-key phones are more widely installed.

Where the Cashaction customer has a 10-key Touch-Tone or a rotary dial phone, the call is handled manually by a Cashaction specialist seated at an IBM 3270 visual display terminal which gives immediate access to customer record data and enables the specialist to enter payment instructions directly into the central computer system.

The customer is charged 10 cents per Cashaction transaction, less than the cost required for postage to mail a check. Commercial Federal guarantees that all bill

(Continued on Page 24)

Protecting the DP Center — Part 3

Electronic Detectors Guard Operations

By Irving M. Crupar
Special to Computerworld

Many detection devices are now available to prevent intrusion and fire. Intrusion devices that form a system to detect motion are extremely useful against theft and vandalism when the computer center is not in operation 24 hours a day.

The ultrasonic motion detection system is widely used. It consists of transmitters and receivers located at intervals of 20 feet, and its operation is based upon a steady frequency not audible to most people.

As long as the receiver receives the frequency emitted by the transmitter, the system is normal. When intrusion occurs, the frequency shifts and the receiver receives a displaced frequency, causing an alarm condition.

Such a system gives total coverage throughout the area being protected and can be installed so as to give zoned protection with certain zones on and other zones off.

Depending on the needs of the situation, other motion detection devices may be employed, some operating on the infrared principle and others using the microwave frequency range. Still others operate by means of the pulsed infrared photoelectric principle.

Any one or more of these systems can be used as a spot-type trap or detector for the protection of an individual door, entranceway or critical point of a computer center. This protection can be useful even if the computer center is in operation 24 hours a day.

Closed-Circuit TV

Valuable proprietary information stored on tape may be a temptation to a dishonest employee who plans to make use of it for his or her own purposes. Some precaution must therefore be taken by surveillance from within to guard against such an occurrence.

This is the third in a four-part series on physical security of the computer center by Irving M. Crupar of the Wackenhut Corp. The series is extracted from a chapter in the Automatic Data Processing Handbook, *copyright 1977 by McGraw-Hill, Inc.*

This week Crupar examines electronic detection devices that can be used to provide varying degrees of security for the computer center. In past weeks he has looked at the needs for security and provided a fire protection checklist.

Next week, in his conclusion, he will examine contingency planning.

This may be accomplished by installing one or more closed-circuit cameras inside the computer center to scan the highly critical areas for transmision to a CCTV monitor located at an appropriate monitoring station or guard console.

It is then possible for a security guard to continually observe the activities in the computer center. At the same time, employees in the computer center realize they are under observation, and the temptation to put confidential company information to personal use is minimized.

An extra precautionary measure that can be implemented is a rule that no fewer than two employees should be in the computer center during normal working hours.

To prevent fire, the computer center should be protected with devices that respond to smoke rather than heat. Today there are ionization detectors that sample the amount of smoke particles in the atmosphere and initiate an alarm when an unsafe smoke density has been sampled.

Even though there are less expensive sensing devices available that respond to temperature rather than products of combustion, it is more important to be notified of an alarm situation when smoke and combustion products are produced.

Ionization detectors should also be provided in the air space below the floor and above the suspended ceiling to sound an audible and visual alarm and to shut down all electrical power passing through the air space.

A portable or fixed carbon-dioxide fire-extinguishing system is preferable to an automatic sprinkler system in the computer room or the computer areas. Carbon dioxide fire extinguishers or carbon-dioxide hand-hose systems installed in accordance with National Fire Protection Association Standards for carbon dioxide extinguishing systems (No. 12-1968 USAS A54.1-1968) can be considered as providing adequate extinguishing protection, provided all the following conditions are met:

- The equipment is at all times under the supervision of an operator or other person familiar with the equipment and trained in operation of the types of extinguishers or hand-hose systems involved.
- Adequate controls are readily accessible to shut down power and air conditioning to the equipment.

(Continued on Page 26)

Because of Trend Reversal

Users in the Market for Add-Ons Urged Back to Basics

By Richard J. Egan
Special to Computerworld

Many of the buying situations that formerly applied to end users in the market for memory have changed because of the volatile nature of that market. The pricing and delivery edge once enjoyed by memory manufacturers that made their own semiconductor memory devices has fallen victim to time, technology and multiple sources of supply.

For the end user of add-on and expansion memory, this means he must once again base his vendor qualification analyses on the old standbys of good service, good products and good price quotations.

Forget the semiconductor device, or the core device, that populates your mainframe's memory. Forget whether the supplier makes or buys his devices. The only points to remember in add-on memory acquisition are these:

- Is the vendor reliable? That means: Has he shipped many units of the type you want?
- Does the product perform flawlessly? The last thing you need is a memory failure. If the vendor has shipped systems like the one you need, his customers can tell you whether they work well.
- Does the product have a future? That is, can it expand well beyond what you forecast as your memory requirements for the processors you now have?
- Are there other value-added features, both in the product (in terms of failureproof devices, cycle speedups, rapid interconnection or simple field-upgradability) and in the supplier (whose reputation for putting users first in priority can be checked out very quickly)?
- Does the vendor have CPU experience? This is very helpful when it is necessary to improve performance and react to any mid-life kicker which may occur.

Like every other part of the computer industry, there are no pat answers — only hard-won solutions.

Trend Reversal

From the time five years ago when memory products such as add-ons for large IBM 370s began to evolve from core-based products to semiconductor-based units, the semiconductor manufacturers were able to retain a slight pricing edge over suppliers who were required to purchase devices from others.

In the past few years, however, almost the reverse has occurred, with nonmakers being able to obtain better prices and faster deliveries from a number of supply sources.

Several factors have caused this reversal. The first and most pronounced has been the very severe price erosion in memory chip components as first U.S. suppliers, like Mostek and Texas Instruments and — more recently and effectively — Japanese firms have entered the memory device business. Thus, the old formula that memory elements accounted for the biggest part of a memory systems price became invalid.

For example, the bit price of MOS storage three years ago was .006 cent while today the same bit costs only .001 cent — six times less.

Thus device manufacturers were forced into product cost parity with nondevice manufacturers as the value of nondevice product components became the predominant factor in ultimate product cost.

In these latter components, very often semiconductor manufacturers have lagged because of the tremendous effort and management preoccupation with delivering large quantities of devices. As a matter of fact, at least two of the major semiconductor companies buy much of the semiconductor memory components used in their memory systems from others.

Thus, in marketing, service, product innovation, product support and all of the assembly, test, quality control and engineering aspects of building complete, plug-compatible memories at a systems level, most nondevice builders were able to attain a substantial lead over device manufacturers...

Because the semiconductor business is so volatile, manufacturers tend to push aggressively for design of newer, larger, faster, more easily fabricated memory devices. It is quite common for such new devices to be designed into the manufacturer's end-user memory systems prior to their acceptance in the OEM sector of the market.

If a particular device is accepted in quantity by OEM users, the resulting lower cost of manufacture gives the semiconductor company a major pricing advantage in his end-user memory systems.

Such, however, is rarely the case. The consequence, then, is that the semiconductor company is stuck with large end-user systems that are populated with very high-cost, virtually custom memory chips of its own manufacture.

The net result, in many such cases, has been product costs far in excess of those enjoyed by memory suppliers who purchase their chips outside.

Priority Problem

Perhaps an even greater dilemma for the traditional semiconductor firm trying to market complete end-user systems is the priorities with which it responds to the demands of two marketplaces.

Having grown up as a device manufacturer serving the OEM market, it tends to be most comfortable there. Having a large, capital-intensive overhead in its semiconductor manufacturing plants, it must attract a high volume of OEM business to remain price-competitive and financially sound.

Thus, weighing the demands of large IBM 370 users against those of large OEM customers, the semiconductor company is forced to make choices which, by upbringing and reality, usually tend to favor the OEM customer at the expense of the end user.

While these problems have not been of great dimension in the past because of the relative newness of the large end-user demand for semiconductor add-on memories they are likely to become severe in coming years as lower cost memory chips from a multitude of sources become available.

Internal Stress

Finally, there is a matter of internal stress within the semiconductor firms that also tends to hamper their ability to serve end-user needs.

It relates to the profit-and-loss pressures put on the two separate entities within the company — the components division, charged with building large quantities of devices to serve its OEM customers as well as its end-user systems group, and the systems division responsibile for marketing complete end-user memory systems.

Most systems groups rely on their components group to thoroughly test and inspect devices to be used in end-user systems. Most OEM customers expect the components group to do the same. (Both users then perform spot testing as a usual practice, but detailed test and inspection is always thought to be the responsibility of the component supplier.)

Two phenomena take place that put stress on the divisional relationship. One is the expectation by components groups that the systems groups, being part of the same organization, will be more careful and thorough in their testing than some outside supplier.

While this can in fact occur, it is always at additional cost to the systems group — in terms of both profit and loss and systems pricing costs.

The second is the natural stress that comes from wanting to sell a product for the highest reasonable price. Management of a components division selling at maximum price to OEM customers would always rather do that than sell at a much lower internal transfer price to its own systems division.

The net result: both price and delivery to in-house units suffer.

Egan is a founder and currently executive vice-president of Cambridge Memories, Inc.

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'Cashaction' Allows Bill Paying by Phone

(Continued from Page 23)

payments will go out on time — the same day if phoned in before 1 p.m. Monday through Saturday.

The computer automatically triggers future dates for bill payments, to avoid late penalty charges. The advance bill payment scheduling allows the customer to arrange payment before leaving on a vacation or extended trip.

A monthly statement from the computer gives a Cashaction customer a full summary of transactions for the period — vendors paid, amounts and dates. It also shows the current account balance and, as an extra financial management aid, lists all payment amounts and dates that the customer has scheduled for the coming month. In addition, the association plans to give each Cashaction customer an annual statement summarizing individual bill payments for the year.

Like Checking Account

"From the customer's standpoint, Cashaction works like a checking account, offering the same financial transaction flexibility, but it earns interest like a savings account," senior vice-president Donald L. Schinzel said, "and there are advantages to vendors receiving the Cashaction payments. They have no 'insufficient funds' checks to cope with because payments are made from funds already on deposit, and complete remittance information simplifies their bookkeeping," he noted.

"A single payment will be made by Commercial Federal for the total amount paid to each vendor (as the volume of transactions grows)."

Cashflow, the commercial customer version of the telephone bill paying and fund transfer program, works just like Cashaction. However, the recordkeeping is tailored to business requirements. It is designed to supplement business accounting systems in such areas as accounts payable and control of cash commitments.

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Service Firm Stands True to Punched Card Data Entry

FALLS CHURCH, Va. — Reports of the death of the punched card are "premature," according to R.L. Scholl, president of DPC Corp., a firm here specializing in punched card data entry.

The service firm concentrates on commercial and governmental keypunching and has 20 Decision Data Corp. 8010 interpreting data recorders and six Tab Products Co. 501 data entry microprocessor-based keypunch systems.

One of the major reasons that people like the punched card, Scholl said, is that many "old timers like to feel and see cards."

The price for card input is "comparable" with tape and disk but, in some applications, cards are more suitable than tape, he added.

Primarily, users turn to the service for large-volume jobs that can't be handled in-house, he said, or for small-volume jobs where it would not be productive for the agency or firm to have all of the necessary equipment since it would not be used enough to justify its installation.

While there have been many dramatic improvements in data entry over the past decade, Scholl said many have ignored the improvements in the card area in favor of the newer types of systems.

Modern Electronics

For example, he said the application of modern electronics and higher speed punching capability has lead to improvements in "key-to-card" devices.

With the 8010 data recorder, "once an operator becomes familiar with its keyboard (which is very similar to the IBM 129 keyboard), card punching is accomplished as fast as the operator can transcribe data," he claimed.

With the units, information is keyed into memory under program control, Scholl said. If an error is made during the keying operation, the operator may backspace and entry the correct data. Once all the information is keyed, the unit automatically punches the card while data is being entered for the next record.

"When cards are verified, they are automatically read into the data recorder's memory and the keyed information to be verified from the documents is compared to the content of memory," he said.

The government accounts for around 40% of the firm's business in terms of dollars, but only about 10% of the active accounts, Scholl said, since the government business tends to require higher volume work.

"We find the punched card the major input medium for many applications within government and industry and it is not apparent that it is about to be displaced," he concluded.

Electronic Detectors Provide Safeguards

(Continued from Page 23)

- All interior sections are readily accessible to manual application of the extinguishing agents.
- There is located within the computer room, and not more than 50 feet from the equipment, either a carbon-dioxide fire extinguisher or carbon-dioxide hand-hose system having a capacity of at least one pound of carbon dioxide for each cubic foot of equipment volume if the equipment is in open racks; one-half pound for each cubic foot of equipment volume if the unit under consideration is enclosed in a cabinet.

A fixed carbon-dioxide extinguishing system can be installed, to be activated solely by manual operation, if it is at all times under the supervision of an operator or other person or persons familiar with the equipment.

If the extinguishing system is to be activated by automatic means, the detecting means should be of an approved type. Particular attention should be given to the choice of actuation means, to ensure detection under the conditions of air flows usually involved in such systems and the small heat release under fire conditions.

When a suitable fixed carbon-dioxide extinguishing installation is planned, it should also be arranged to sound an alarm automatically and shut down the power and air conditioning supplied to the equipment involved.

Halon systems for fire or smoke extinguishing are relatively new and effective for total coverage of hazards involving gaseous and liquid flammable materials and electrical equipment.

However, Halon systems will create a toxic environment which can cause dizziness and loss of coordination after a minute's exposure at more than 7% concentration.

Factory Mutual Engineering Corp. in Norwood, Mass., can provide the names of fire-extinguishing systems that have been tested and approved by it and will provide recommendations for specific environments.

When not in use, magnetic tapes (reel or cassette) and disk packs should be stored in cabinets with adequate shielding.

If they are stored one foot from the inner walls of the cabinet, no degradation of recorded signals will be caused by magnetic or electromagnetic devices carried into the storage room. Several manufacturers produce suitable cabinets and shielding materials.

Additional protection is afforded by the normal ferromagnetic metal walls found in many computer installations. Any metal wall to which a magnet will adhere will provide some shielding against magnetic fields. Most drum and disk cabinets are made of plastic; however, they could also be made of shielding materials.

A tape vault should be installed as far away as possible from all fixed sources of stray magnetic fields such as large transformers, motors and generators.

Shielded containers are particularly valuable for transporting tape reels that contain important data. The tapes in repository should not be subjected to temperature extremes, since these can produce both physical damage and erasure effects.

Since a magnet with a field intensity of one tesla (10,000 gauss) can be carried in a briefcase or a woman's purse, measures should be taken to prevent the entry of persons possessing such devices. Magnetic detectors (e.g., magnetometers) may be used at close range to apprehend the would-be saboteur.

Detectors that will warn of concealed magnets without keepers are quite inexpensive (less than $1,000). Detectors for magnets with keepers will cost from $1000 to $5,000.

It is difficult to retrieve recorded information from a magnetic medium whose timing or clock track signals have been damaged. This damage can be inflicted with magnetic devices or by interfering with the recorded process as it occurs.

Devices such as simple spark gap units plugged into wall outlets or small concealed battery-operated transmitters can cause interference with the magnetic recording process as well as with other computer functions.

Therefore, regular searches of the entire facility should be conducted for such devices.

Duplicate copies of all important tapes, such as master and program tapes, should be kept in a different, secure location.

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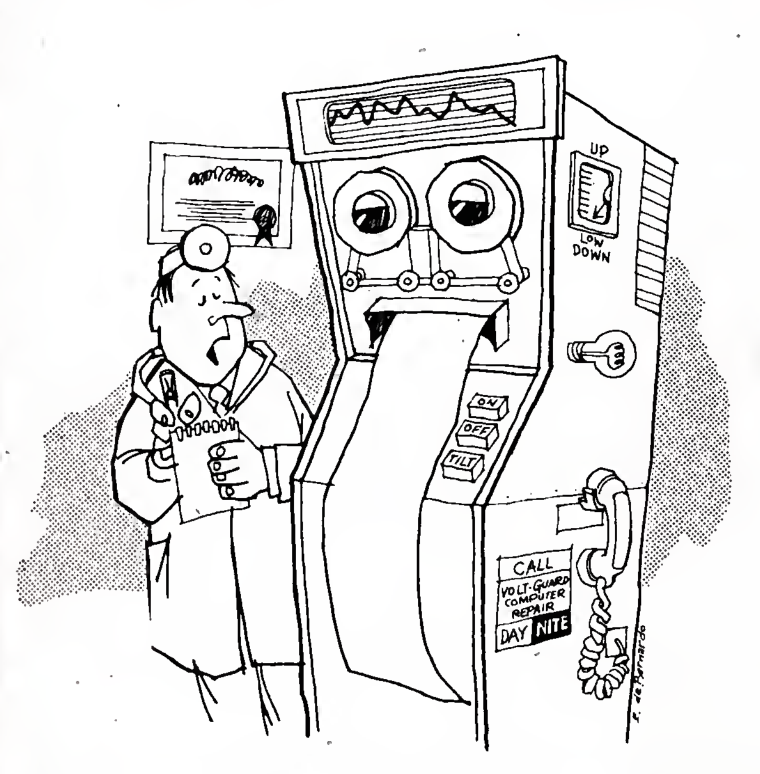

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Both Systems and Peripherals

Debuting Products Offer Increased DP Alternatives

By Esther Surden
Of the CW Staff

DALLAS – Products ranging from complete systems to minicomputer disk drives made their debuts on the floor of the National Computer Conference here recently, offering users more options than ever before.

Among the systems introduced were Four-Phase Systems, Inc.'s System IV/90, General Automation, Inc.'s 16/550 and 16/330, Datapoint Corp.'s 6600 and 1170 and Beehive International's Beehive Office Supervisory System [CW, June 20].

Texas Instruments, Inc. introduced a system based around its Model 990/10 CPU. Called the DS990/10 Model 1, the system was designed for commercial, industrial and general DP environments.

Software for the system includes Cobol, which was previously available for the TI CPU, and Basic and Business Basic, which are supported under an enhanced DX10 multiuser disk-based operating system.

The operating system allows support of up to eight terminals in a heavy interactive program development mode as well as batch operations. A system command interpreter supports query or control commands with or without prompting, the company noted.

An entry-level system includes 40K words of memory, a Model 911 CRT terminal with either 960- or 1,920-character screen formats and 5M bytes of fixed and removable disk. It is housed in a two-bay desk and includes DX10, software development system software and a one-year software update subscription service.

The language compilers are available under software license and memory can be expanded to 1M words.

The entry-level system costs $26,500. Users purchasing the system before Sept. 30 will receive a programming language free of charge, a spokesman added from the Digital Systems Division, P.O. Box 1444, Houston, Texas 77001.

Randal Link-500

Randal Data Systems, Inc. went to NCC with the Link-500, a small business system that can accommodate up to 200M bytes of disk.

The basic system contains an operator's console with CPU and a double-sided double-density floppy disk drive with 1.2M-character capacity. A top-loading disk drive and 70 line/min printer are also included.

The Link-500 can handle up to 16 remote terminals concurrently and has battery backup to protect memory from power failure. It is program-compatible with the rest of Randal's line and can handle a variety of peripheral equipment, the company said.

The system, which will be available in October, has 64K to 128K of memory and costs $45,900. Randal is based at 365 Maple Ave., Torrance, Calif. 90503.

IBM 5100 Alternative

Intelligent Systems Corp. introduced the Intecolor 8031, a system it said is comparable to the IBM 5100.

The Model 8031 desktop system contains 27K of memory expandable to 64K and features a front-mounted floppy disk and a tape drive. It uses Basic language and has a screen that can display up to 3,840 characters.

The firm is offering light pens, 16 special function keys and an additional 8K random access memory as options for the system.

The basic 8031 costs $5,495. The company is at 5965 Peachtree Corners, E. Norcross, Ga. 30071.

Disk Subsystems

Data 100 Corp. brought out two cartridge disk subsystems it said are compatible with Data General Corp. and Digital Equipment Corp. products.

The DG-compatible 10M-byte Model 3860 cartridge disk subsystem uses IBM 5540-type removable cartridges and is available with a top-loading disk cartridge plus a fixed disk, the firm said.

The single-board controller for up to four disks fits into the mini's chassis. The unit costs $7,995.

The DEC PDP-11-compatible Model 3850 disk subsystem has a removable front- or top-loading disk cartridge and a fixed disk. It can be configured with four dual-platter disk drives for up to 20M bytes of storage.

It is compatible with the DEC RK-11 subsystem.

The 5M-byte version costs $7,950 and the 10M-byte model costs $8,350. Data 100 is located at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

EDS Multiplexer

Educational Data Systems, Inc.'s (EDS) Mighty-Mux 11L was described as an input/output system for DEC's LSI-11 processor. Designed to allow the system to interface to up to 128 devices via direct memory access, the unit reduces the I/O processing time of the LSI-11 from about 70% to less than 2%, the company claimed.

The unit uses extended address bits for systems with up to 256K bytes of mem-

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User-Oriented Micros Seen in Distance

By Esther Surden
Of the CW Staff

DALLAS – Microcomputers have a long way to go before they are the user-oriented systems the industry would like to see, according to speakers at the recent National Computer Conference.

Addressing a session called "Impact of Microcomputers – 1980," the speakers pointed out that micros are still in their formative stage.

"The micro is a primitive machine," according to Tim Berry, a consultant. "In terms of cost, the microcomputer is the most expensive computer" because the "architecture is a compromise – it's convoluted."

The units are difficult to use to maneuver data and they are "impossible to understand," he said.

This trend will probably continue because of industrywide inertia and the desire for upward compatibility, he contended.

The lack of good higher level languages for microcomputers also makes them less desirable. PL/M and Basic are the only two languages really available for the units, and they don't match the needs of the users. "We need a language in which it's easy to move the bits of data around," he said.

Another problem facing prospective micro buyers is the lack of experienced programmers. "Probably the last person to put on a micro is someone with 10 years of OS/VS programming experience," Berry said.

The ideal microcomputer programmer combines hardware and software knowledge and generally comes up from the mini area, he said.

Because micros are so inexpensive, they have a tendency to get designed into devices where they do not really belong, he said. No one takes into account the software development costs when using micros this way.

One way to optimize the use of the small system is to make sure "you turn the product around." Extreme cases of software optimization lead to the "Name That Tune" syndrome which the players say, "I can do it in 2 bytes less than you can," he said. With inexpensive memory, this is no longer necessary.

Don't Save Memory

"People should not be optimizing code to save memory," according to Don Pezzolo, manager of product development for Cognition, Inc.

Memory will continue to become less expensive, he said, noting a 64K-byte random-access memory will be in common use by the mid-1980s.

"Very fast" bubble memory, too, will be used by then and users can put the two together to form a very inexpensive memory system, he said.

Soon 16-bit computers on a chip will be in the majority, he said, and more functions that are now on boards will be brought to the chip level. For example, there will be interface chips for $30 that are now contained on boards that cost $250, he predicted.

The smaller a system is, the faster it is, he noted. Today CPUs run at 2- or 3 mHz, but soon they will run at 4- or 5 mHz. "Today you can get selected parts of systems to run that fast; tomorrow you can get whole systems," he said.

"When you realize that people are going to use micros for what they used minis for before, speed is very important," he added.

The packaging of the chip will change as well, Pezzolo said. A chip today has about 40 pins, but this will be increased to about 48 or 64 pins, he forecast.

"This will allow nonmultiplexed buses, and we definitely want to go to more pins per package to reduce the necessity for multiplexed signals," he explained.

Virtually every major application in the home is going to use a micro, he stated, but it is a fallacy to believe the average person is going to learn how to program one. "How many people do you know who actually use the memory key on their calculator?" he asked.

Instead there will be a large, very sophisticated computer in the home, but it will be "very transparent to the user," he predicted.

No HAL For Homes

The belief that individuals will have a microcomputer in their homes comparable to HAL in the movie "2001" is a myth, according to another speaker, David Guzeman, president of Iasis, Inc.

The question home users ask is: "What can I do with my computer?" No one seems to know, Guzeman said.

The present state of the art is "playing 'Star Trek' in Basic," he noted.

Presenting the historical point of view of the microcomputer industry, Guzeman noted that cost has been the driving factor determining how micros are used. Cost considerations led to the large-scale integration techniques in use today, he added.

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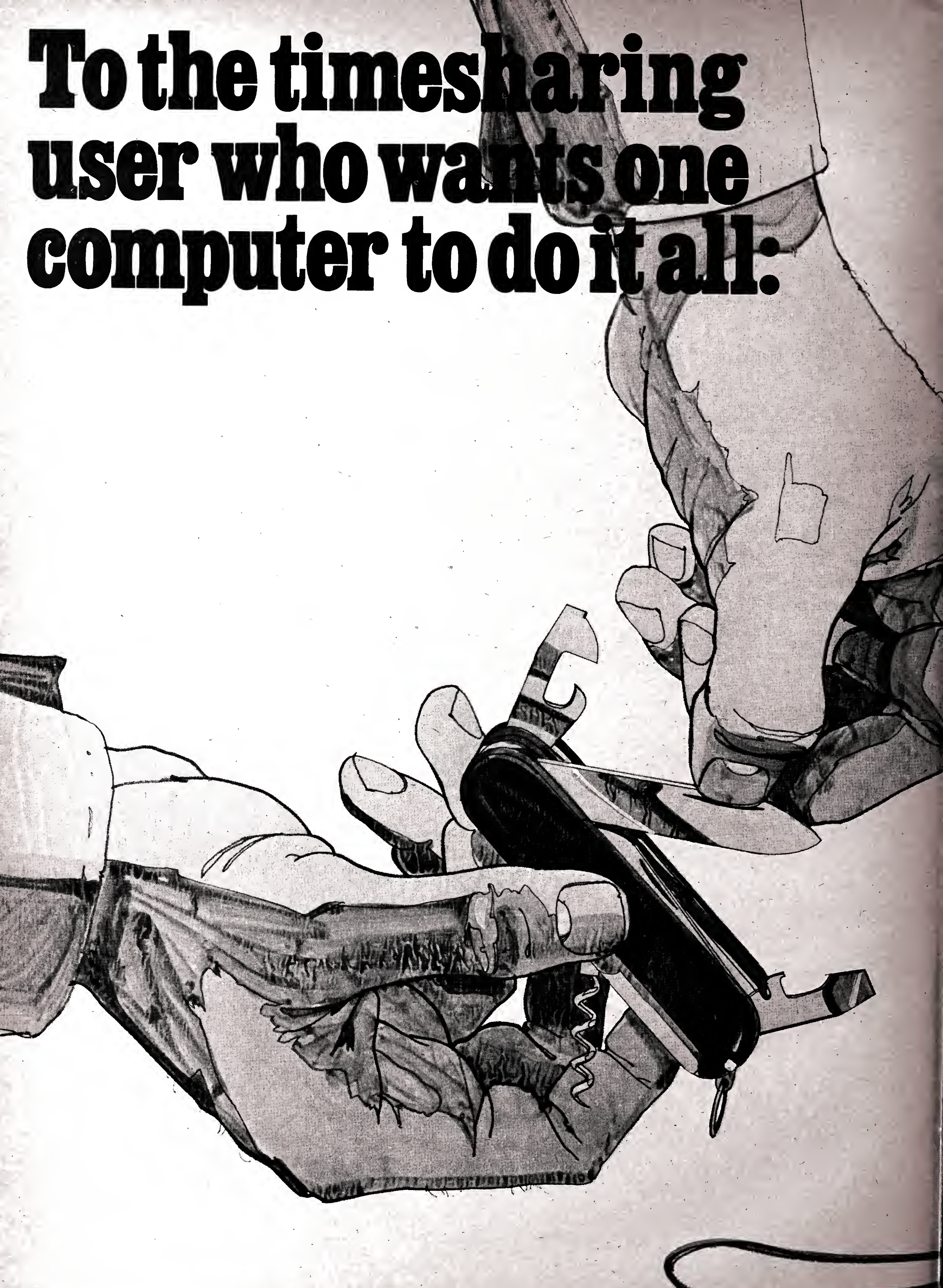

Prime timesharing systems, like Swiss Army knives, are multifunctional, compact and easy-to-use. Both provide a collection of tools, each fitting a different need, all fitting together in one very reasonably priced, elegantly-engineered package. But a Prime computer, unlike the army knife, lets many people use all the tools all at once.

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Typical systems for computational timesharing applications range from $41,000 to $300,000, or about $1,300 to $9,800 per month if leased from and maintained by Prime.

To find out how one Prime computer can do it all for you, contact David R. Johnson, Business Manager, Prime Computer, Inc., 145 Pennsylvania Avenue, Framingham, MA 01701, (617) 879-2960.

PRIME

Prime can help

Minis Help Building Suppliers Harness Their Paperwork

ANCHORAGE, Alaska — Two large building supply companies and lumber yards here are using minicomputers to harness runaway paperwork generated by rapid growth.

Spenard Builders Supply is averaging over 1,000 transactions a day, according to the company's general manager, James Campbell, who reported the number of transactions nearly doubled in the last two years.

At United Lumber Co., which also operates United Building Materials between 800 and 900 transactions are made daily. The number of transactions have more than doubled during the past two years, according to President Richard Evans.

The first minicomputer was installed in Spenard Builders Supply in March 1974. "We selected an NCR 399 minicomputer," Campbell explained, "because it allowed us to handle our most pressing problem — receivables accounting — immediately, without requiring any major charges in operation.

"Furthermore, we are also able to get access to sales statistics as a byproduct, and we have laid the foundation for absorbing expansion," he said.

Floor Orders Taken

Orders are still written on the sales floor, Campbell continued, but now they are sent upstairs to the accounts receivable department for extension and processing.

Customer service is expedited this way, and a major source of potential human errors is expunged from the bookkeeping system, he stressed.

About 80% of the orders taken on the floor are charges, Jo Ann Hart, account receivable supervisor, said.

In these cases, the sales clerk fills out a four-part form, handwriting the customer's name, descriptions of each item purchased, and charges. The customer takes one copy and the others are delivered to the accounts receivable department.

There, the form is coded with the customer's account number, the type of sale (i.e. retail, wholesale, low margin, etc.) and the department or product category (i.e. roofing material, hardware, etc). At this point, the information is ready for data entry.

As the sales volume increased, a second NCR 399 minicomputer was installed to help handle the larger load, Campbell said.

"We used to post individual customer ledgers, and we still have this potential with the minicomputers," according to Lib Heafer, credit manager. "However, we decided that would be redundant."

Instead, the day after an order is taken, the invoice is extended in the carriage of one of the minicomputers. As part of the same operation, biling and sales information is captured on a magnetic tape cassette, she said.

One copy of the extended invoice is kept in an alphabetical file for mailing to the customer along with the monthly statement. Another is kept as the permanent record and a third is used as a ledger by Heafer.

Cash on Cassettes

Cash sales are also entered onto the cassettes, since the information is used for statistical reporting, and receipts are filled out and entered into memory for all payments, Hart continued.

At the end of each month, the new data is merged with account histories stored on cassettes. Detailed statements are printed out with 30-, 60- and 90 days aged analysis for all accounts with balance due:

Approximately 2,500 statements are printed monthly for the 3,000 active accounts, Hart said. A copy of every extended invoice is stuffed into an envelope along with the statement for mailing.

Heafer is given a copy of all statements with balances due for more than 30 days. These customers are immediately contacted by telephone, and if arrangements can't be made to settle the account, they are put on a cash basis, Heafer said.

Operator performs invoice application at United Lumber Co.

Meanwhile, Campbell and others in management receive a monthly and year-to-date sales analysis report.

United Lumber Co. also selected the NCR 399 when it decided to upgrade from a ledger-style mechanized bookkeeping system.

"Our main objective was a need for current sales distribution information," according to Evans.

"We are growing fast and are adding new sales outlets in outlying areas. I needed a fast and accurate way to keep track of sales by product category," he said.

Evans hired a consultant who recommended the installation of a larger, DP system. "He said that we would soon need the capacity of a larger computer," Evans recalled, "so we might as well grow into it."

Beware of Used Minis: Newsletter

NATICK, Mass. — The used minicomputer business is a 'caveat emptor' proposition where the buyer must analyze the risks and rewards" of his decisions "and bear full responsibility for the results," according to a recent article in the *Minicomputer Applications Analyzer,* a monthly newsletter.

Used equipment available for user consideration ranges from one-of-a-kind systems to systems that were never "able to accomplish satisfactory results for the user and had to be removed from the environment," the article stated.

"As few vendors have the capability of accepting returned systems and/or refurbishing for resale, the equipment that is rejected usually goes directly into the used minicomputer marketplace," the article said.

The first place to go to find a used mini is through a reputable used computer dealer, the newsletter said, because the dealer may know the going price of an item or even have it on hand. Also, the dealer "usually maintains an engineering work force . . . to inspect equipment," the newsletter stated.

Another place users can look is in used equipment directories, which are really want ad fliers that list both equipment for sale or purchase.

Used minis are also listed by services that "basically secure a fee from the organization that has equipment which they would like to sell and then maintains a listing of said equipment," the article continued.

Classified ads in trade newspapers and magazines are good places to look, the article advised. However, "the best places to look are the major metropolitan area Sunday newspapers in their industrial equipment classified ads," the report noted.

"Used minicomputer equipment is certainly not for everyone" the article cautioned. "However there are some specific situations" where the used mini can be "both desirable, preferable and sometimes the only place to locate specific equipment."

Users who would benefit from looking at this alternative are those who already have minis and would like to duplicate them or enhance them; users whose equipment is no longer manufactured or directly supported by the vendor; and the electronics experimenter.

The *Minicomputer Applications Analyzer* costs $36/year from International Management Services, Inc. 215 Oak Street Natick, Mass. 01760.

BST Enhances Chaintrain Printers To Interface With HP 3000 Minis

SANTA CLARA, Calif. — Business Systems Technology, Inc. (BST) has enhanced its line of chaintrain printers to interface with Hewlett-Packard Co. 3000 minicomputers.

The printers have speeds of 300-, 425-, 600- and 1,000 line/min with a standard 64-char. set. Character sets of 96 are also available.

The BST printers are fully buffered to enable the CPU to perform other processing tasks between printer line settings, according to a spokesman.

Six print copies can be made and multipart forms from 3.5- to 19.5-in. wide can be accepted. The printer operates under standard systems software.

The line of printers is also compatible with the IBM System/3 and Digital Equipment Corp., Data General Corp., Interdata Corp. and other HP minicomputers, the spokesman said.

The BST/600 (600 line/min) printer, for example, costs $15,000 from the firm at 3015 Daimler St., Irvine, Calif. 92714.

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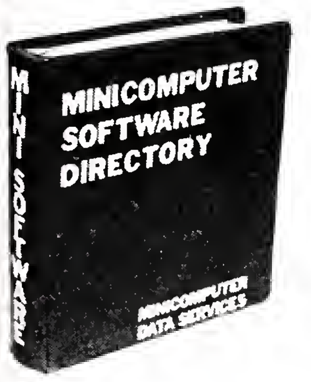

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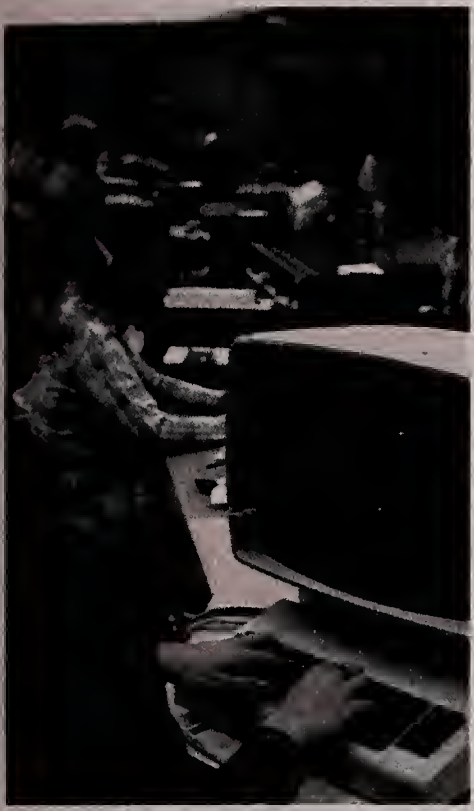
DP Dialogue

Notes and observations from IBM
that may prove of interest to
data processing professionals.

SDLC Cuts Network Costs for First Federal of Peoria



Online teller terminals improve customer service at First Federal of Peoria. SDLC significantly cuts network costs.

"We are supporting 200 terminals in 44 locations in central Illinois from this computer center. And we need reliability and operating economy. That's why we went to SDLC, installing the 3600 Finance Communication System and the 3270 Information Display System." The speaker is Alfred Biagini, vice president-data processing of First Federal Savings and Loan Association of Peoria, Illinois.

SDLC stands for Synchronous Data Link Control, an advanced line control discipline for communication between terminals and computer. It is a key element of Systems Network Architecture, IBM's most advanced telecommunications technology.

"We've been able to adopt SDLC gradually," says Biagini. "With System/370 we can run different types of terminals—with different line disciplines—against the same application programs. And we can operate the 3270s at some locations under SDLC while running others under the older bisynch discipline. We can convert a few at a time, with no impact on the application software of our Model 145.

"We achieved immediate savings at each location," he adds. "SDLC requires little phone line conditioning and uses a low-cost modem, so our leased line cost is $79 per location instead of $203.

"At the same time," he notes, "our SDLC lines are remarkably trouble free." SDLC includes highly sophisticated error-correcting facilities which compensate for most common line imperfections, making it very reliable.

"Our tellers found they were getting faster 3270 display response during terminal transactions using SDLC. We measured a decrease from 6.56 to 4.44 seconds. Equally important, we see less variation in response time in the busiest periods: 25 instead of 66 percent.

"We've also reduced the total number of leased lines," Biagini says. "SDLC lets us put dissimilar terminals on one line. A 3270 display system and a 3600 series unit on one line, for example, can access the same or different applications. Here at First Federal, SDLC is providing better performance at significantly lower cost."

Software Products from IBM

Three products available from IBM support conversational computer applications:

1. Interactive Instructional System (IIS) Used for individualized computer-based training of personnel, and for the creation of computer-aided instruction programs.

2. Display Management System/Virtual Storage (DMS/VS) Provides display functions in pre-programmed form for applications using the 3270 Information Display System under Customer Information Control System/Virtual Storage (CICS/VS).

3. Interactive Query and Report Processor (IQRP) Permits end users to query data files or extract information in a simple free-form language.

For more information on these products, write to the Editor of DP Dialogue at the address below.

TSO: A Sharp Pencil for Bendix Cost Estimators

Cost estimating to prepare aerospace electronics bids is challenging, time consuming, and expensive. The Flight Systems Division of Bendix Corporation routinely spends $50,000 or more to develop a single competitive bid and its thick volumes of supporting documentation.

Now, with interactive computing, reports Will E. Frey, manager of cost estimating for the Teterboro, N.J. division, Bendix is producing estimates faster than ever before, with less overtime and greater accuracy, and with productivity increases of more than 30 percent.

"In 1975," he says, "we began to convert to interactive computing procedures under TSO." (IBM's Time Sharing Option, or TSO, supports interactive use of the computer by end users.)

"One reason for going interactive," Frey continues, "is that preparing an estimate is a huge data entry job: a cost analyst must enter hundreds of line items to be separately calculated by a costing formula. Handling data entry interactively, the analyst enters these numbers directly, as he develops them. This eliminates data preparation as a separate activity, while programmed checks catch most data entry errors immediately.

"With interactive computing, we can try different numbers—shifting profit margins or labor costs a little—to see the effect on the final numbers. In the same way, we can test the economics of alternate manufacturing technologies—to see, for example, whether it would pay to invest in an automatic insertion machine for printed-circuit board fabrication. In a competitive climate, this lets us sharpen our bids.

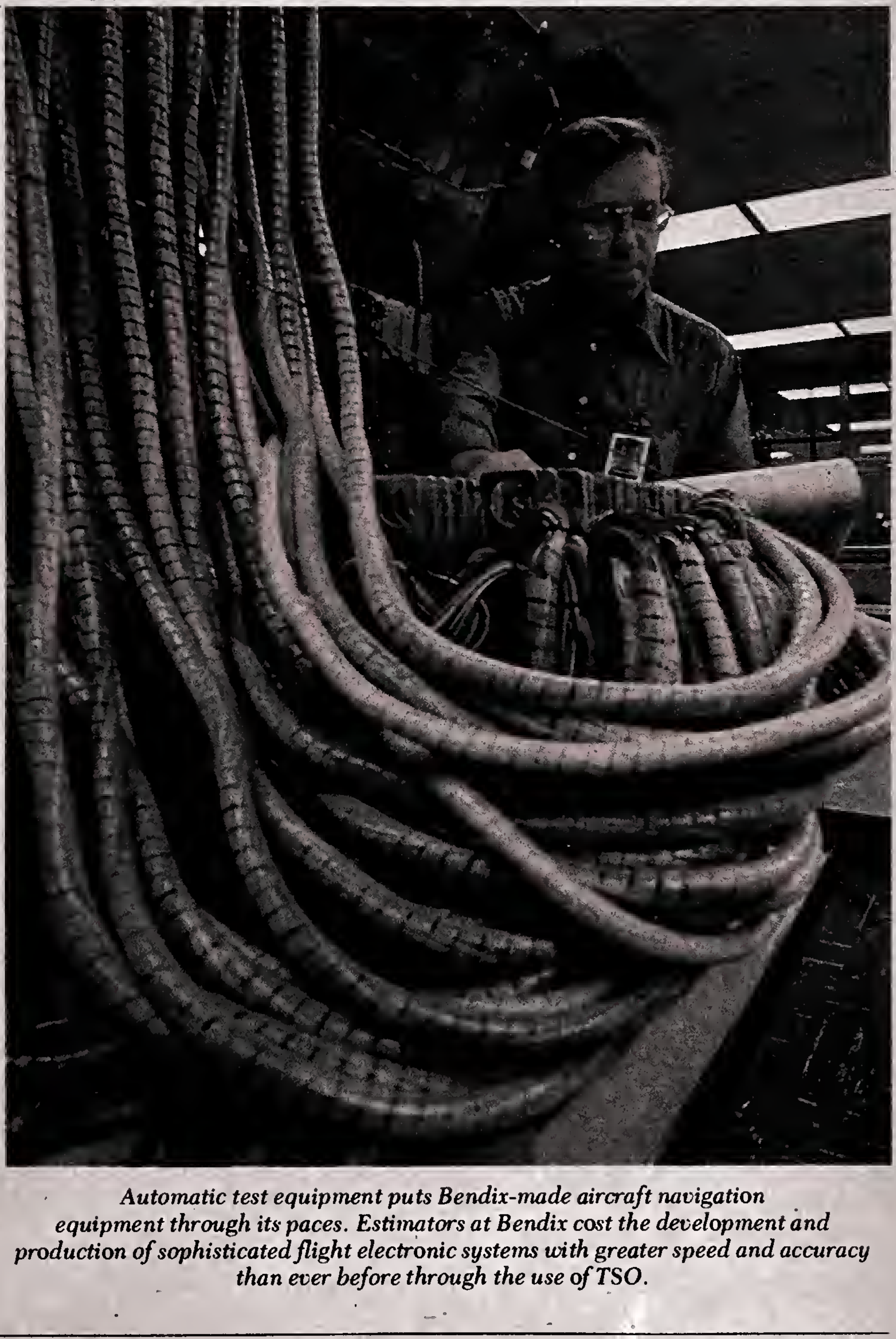
"In the negotiating phase of a contract award," Frey adds, "after the supplier is selected, it is standard practice for the customer to go over the bid in great detail, questioning the numbers and looking for opportunities to reduce the price. With an interactive costing system, we can respond to the customer immediately; we can answer questions and sometimes conduct negotiations over the phone."

Cost analysts in the division headquarters use IBM 3767 or 2741 Communication Terminals, which access a System/370 Model 158 in the company's Teterboro, N.J. complex.

"We've just about eliminated night work," adds Allen Handzo, cost estimator. Not a professional programmer, Handzo briefly studied VS BASIC, an IBM programming language oriented to the end user. He has written 50 programs now in use by the cost estimating department.

"Preparing the sheer volume of tabular material formerly required big pushes of overtime to meet bid deadlines," Handzo says. "Now we finish a bid early enough to let top management take a thorough look at it. And, if management review leads to revisions, the computer can quickly generate a new estimate in full detail."

"We can develop more and better information for our customer," says Frey, "and respond better to his needs. These are important advantages in a very competitive market."



Automatic test equipment puts Bendix-made aircraft navigation equipment through its paces. Estimators at Bendix cost the development and production of sophisticated flight electronic systems with greater speed and accuracy than ever before through the use of TSO.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

IBM®
DATA PROCESSING DIVISION

Users' Options Grow as Systems, Peripherals Debut

(Continued from Page 27)

ory and operates in either half- or full-duplex mode.

All important parameters are under program control on a port-by-port basis, EDS said. Parity mode, character size, automatic echo and transmission rates are also under program control. Asynchronous or synchronous operation is selectable.

The unit costs $1,600 for the basic four-port model. EDS is based at 1682 Langley Ave., Irvine, Calif. 92714.

Monolithic Systems Corp. introduced a dual-height memory for the LSI-11. The unit provides up to 32K words in a single option slot, the firm said.

The MSC 4601, available in 16K-, 24K-, 28K- and 32K-word configurations, features either on-board distributed refresh or external refresh. An on-board DIP switch assigns the address position in 1K increments, the firm said.

The memory has an access time of 450 nsec and a cycle time of 625 nsec. The 28K-word version costs $2,075 from the company at 14 Inverness Drive East, Englewood, Colo. 80110.

Pertec Peripherals

Pertec Computer Corp. brought a couple of minicomputer peripherals to the show.

The firm's Intelligent Floppy has a built-in controller/formatter that is said to eliminate the need for separate controller hardware and associated cables.

The floppy incorporates a single circuit board within the disk drive chassis, a spokesman explained. The drive uses a conventional 8-in. diskette with disk formatting to the IBM 2740 format.

The unit is "expected to provide easier system maintenance," the company added. It costs less than $1,000 and will be available in the fourth quarter.

Pertec also introduced a flexible disk drive for 5.25-in. diskettes that offers double-density recording of 250,000 bytes on each side of the diskette.

The FD200 microfloppy drive is mechanically and functionally interchangeable with the diskette drive introduced earlier by Shugart, Pertec claimed, but it permits writing on 40 tracks as opposed to 35 for the Shugart drive.

Interface electronics are contained on a single printed circuit board, Pertec said, and up to four of the units can be daisy-chained on a single cable. The FD200 costs $405. Pertec is at 12910 Culver Blvd., Los Angeles, Calif. 90066.

Alpha Data, Inc. brought a large head-per-track magnetic disk mass memory to NCC. Called Model Eighty, the unit can accommodate 8M bytes of memory with an average access time of 8.5 msec.

The system, which can handle 128 to 512 tracks using fail-safe retractable head lifters, features heads that are locked up during nonoperating modes.

The Model Eighty has illegal address warning, write protection and flexible sector formatting and features an 8.5- or 17 msec average access time, according to the company.

The disk drive with 8M bytes costs $18,700 and can be linked to DG or DEC systems.

MFE Mayflower

MFE Corp. introduced a small double-sided, double-density disk drive. The Mayflower 700/750 uses a "Heli-Band" head-positioning system on the IBM-compatible drive, which is said to give a 3 msec track-to-track access time.

Available with either a center-mounted brushless dc spindle drive motor or a corner-mounted ac motor, the system uses media with 77 tracks per side at 48 track/in. Data transfer rates are 250 kbit/sec per side.

The unit costs $725 from MFE at Keewaydin Drive, Salem, N.H. 03079.

National Semiconductor Corp. introduced its NS3-2, a self-contained semiconductor random-access memory (RAM) system with a maximum capacity of 1M byte.

Designed as a general-purpose add-on memory for most minicomputer systems, the unit uses 16-pin, 16K dynamic RAM chips as the basic storage element.

Configured in four printed circuit board cards with a maximum capacity of 128K by 22 bits each, the NS3-2 has a read or write cycle time of 450 nsec and a read/modify write cycle time of 650 nsec, the company stated.

The NS3-2 also contains a timing and control card. A custom interface card and special features card are available as options, National Semi said.

Including optional error-correction code, the unit costs $26,500.

The firm also introduced a line of 32K by 18-bit double-density memory storage cards designed for use with the DEC PDP-11 series of minicomputers.

The card occupies only one system unit slot and is said to be completely compatible with the PDP-11 hardware, software and standard peripherals.

The cards cost about $1,600 each in OEM quantities from 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

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COMPUTER INDUSTRY

CI Notes

AM Consents to FTC Ban On Dual Directorships

WASHINGTON, D.C. — Addressograph-Multigraph Corp. (AM) has agreed to a government order barring it from having interlocking directors with competing corporations.

The consent agreement settles a complaint filed by the Federal Trade Commission (FTC) last July charging AM and TRW, Inc. with having an illegal interlocking directorship [CW, Aug. 9]. At that time both firms denied the allegation and deplored the investigation of a "moot" point.

TRW and Horace A. Shepard, the director in question, have refused to sign consent agreements, according to the FTC. Their cases will be heard by an FTC administrative judge later this summer.

AM also agreed to establish procedures to detect such interlocking directorships with competing corporations.

An AM spokesman noted, however, that "we still contend that there was in fact no competition between Addressograph and TRW as alleged in the original complaint."

CMI to Handle Own Lease Base

BEDFORD, Mass. — Cambridge Memories, Inc. (CMI) will begin direct management of its currently installed base of leased IBM 370/145 add-on memory systems under terms of an agreement reached with North American Corp.

The Cambridge 370/Stor 145 equipment lease portfolio — valued at over $3 million — had until recently been owned and managed by New England Merchants Leasing Co.

North America Corp. acquired the 370/Stor 145 lease base, which it has now turned over to CMI to manage. This agreement is independent from the $12 million lease financing arrangement consummated earlier this year between CMI and North American, spokesmen said.

WUI, Telenet Link Networks

NEW YORK — Western Union International, Inc., a unit of WUI, Inc., has signed an interconnection agreement with Telenet Communications Corp. for the provision of international data services.

WUI's international communications network will be connected to Telenet's domestic network to enable subscribers via Telenet to utilize WUI's Database Service to the UK, which started in February.

After IBM 3270 Pricing Move

Terminal Makers Act to Retain Profits

By Molly Upton
Of the CW Staff

Terminal makers in the IBM 3270 arena either have reacted to IBM pricing moves or are evaluating their actions.

Looking on the bright side, most view the pricing moves as an indication by IBM that the 3270-type product will have a long life.

On the other hand, however, the independents are going to need improved cost control in order to retain their profit margins if they adjust their prices to preserve the gap between their prices and IBM's, observers said.

In a wide range of announcements, IBM adjusted prices on its current line of 3270, 3790 and 3770 terminals and also introduced terminals and controllers which, in addition to Systems Network Architecture capability, offer lower prices [CW, May 23].

IBM also gave its 3791 controller communications capability along with extended control storage in a move aimed at the distributed data processing market.

What prompted IBM's actions?

International Data Corp., a market research firm, reported IBM's share of the 3270-compatible market slipped from 80% at year-end 1975 to about 70% at year-end 1976.

Price War Possible

Rather than interpreting IBM's actions as a move against the independents as a group, John Douglas, executive vice-president of Courier Terminal Systems, sees them as a way to cut AT&T and its Dataspeed 40/4 "off at the pass." There may be a price war, he believes.

The announcements on the 3270 line indicated to Courier that the coming market will be "absolutely enormous," Douglas said. The 3270 market totaled 400,000 or 500,000 units, and the next product will see probably one million or 1.5 million units.

"IBM's going to have the lion's share unless someone can get down and compete with it," he added.

At least one independent said he expects some terminal makers to "pass" on this round of pricing and concentrate on other markets, such as data entry, rather than continue to compete head-on with IBM.

Although at least one maker whose line includes controllers said he thinks the price cuts could mean trouble for those who make only terminals on a look-alike basis, another terminal maker said that won't be the case.

One point of view is that manufacturing a controller as well as the terminal provides a greater area in which to spread the profit margin and to offer capabilities not provided by IBM.

However, another view is that future placements of independent terminals might be easier because of the lack of a controller.

Some firms in the distributed processing market did not have much comment on the IBM moves. Datapoint Corp. doesn't view the upgrading of the 3790 as having a significant impact on its business, according to Herb Hensley, director of product marketing.

"Until IBM puts languages on the 3790 and makes it easy for the customer to compile," the controller won't represent real competition to the Datapoint line, he said.

Datapoint doesn't plan any pricing changes, he added.

John Clark, vice-president of marketing for Four-Phase Systems, Inc., declined to comment on IBM's moves or whether his firm will initiate any reaction.

However, those who make 3270-compatible terminals were more voluble.

Joe Hitt, vice-president of Raytheon Data Systems, said his firm will continue to be 15% below the IBM gear in price and offer enhancements to its products.

"We're going to have to adjust some of our pricing to meet the competition. We have almost all of the features [announced in the new IBM line] and we'll have to add a couple," he said.

Raytheon makes its own controller as well as terminal; its customers don't buy strictly for a plug-to-plug replacement, but rather for the added capabilities, he said.

These include the ability to communicate concurrently in batch and interactive modes and to operate on a packet network under

(Continued on Page 36)

Mini Makers See Bubbles, CCDs, Transparent Software in Future

By Toni Wiseman
Of the CW Staff

DALLAS — Bubble memories, charge-coupled devices (CCD) and user-oriented software are a few of the advances for which minicomputer users can look in the future, according to mini makers at the National Computer Conference here recently.

Hierarchical memory is also a trend several manufacturers expect to evolve with the move toward the newer technologies.

Bubbles and CCDs will not be used as main memory, but rather as add-ons to replace head-per-track devices and even disk drives, according to Samuel D. Lane, standard products marketing manager for General Automation, Inc.

These new technologies will allow manufacturers to put more storage in the computer itself and eliminate the electromechanical gear that causes so many headaches today, Lane said.

But, he added, there is one significant drawback to these devices — they are nonremovable. They are also currently too expensive to give each user his own media; it has to be an auxiliary memory, he said.

Lane suggested a hierarchical package would be a very effective approach in the future. Such a configuration would use MOS main memory, CCD as swapping memory for fast access to large data bases and disks for bulk storage.

GA is not interested in replacing IBM mainframes, Lane indicated, but rather is looking for applications where it can prove that a minicomputer network approach is a sounder one than a large mainframe.

GA announced a product at NCC, for instance, which in a 2 by 4 channel-coupled configuration or a 2 by 2 direct-coupled/-shared memory configuration is said to equal the power of an IBM 370/158.

IBM may, however, be a factor in the mini market itself, Lane noted, predicting that in 10 years IBM will claim 30% of the mini marketplace, which will account for 10% of the total computer market.

"I don't think IBM's entry into the mini market will have a great impact yet. There's always a flurry after this kind of move and everyone is concerned, but I don't see much happening yet.

"For us, IBM's entry will be good because it sanctions the network concept we've been promoting," he stated.

Edward B. Rivernider, Prime Computer, Inc.'s director of marketing support, said his company's entire product line is trying

(Continued on Page 36)

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Governor Salutes DP Firms

Technology Called State's Key Asset

By John P. Hebert
Of the CW Staff

WOBURN, Mass. — Technology in general and computer technology in particular are the key elements in the economic future of Massachusetts, according to the state's governor, Michael J. Dukakis.

The relationship between technological improvements and state government is very important, Dukakis said in a keynote address at the recent Computer Caravan in this Boston suburb.

Effective management of the state government combined with help from the private sector, notably this state's major computer companies, has helped Massachusetts try to get out of "the worst financial problems in many, many years," Dukakis said.

Monumental Effort

"And although there is room for improvement, I must say that the turnaround of this disastrous problem in two years is a monumental effort," he told conference attendees.

By putting into practice the slogan "do better with less or the same," Massachusetts has saved its taxpayers between $70 million and $80 million. One way in which this was done, Dukakis indicated, was through effective utilization of computer resources.

One of the most important recommendations from a governor's task force study was to quantify the number of computer systems working in state government — or the lack thereof, Dukakis said.

In addition to these efforts, the governor said he has established a strong DP advisory panel of five experts to develop a strong and rational approach to DP at the state level.

Updating State DP

"We are beginning to get our own DP house in order to bring the Massachusetts state government into the 20th century," Dukakis noted.

There are two major categories in which this is happening, he said. One is the procurement of a Medicaid Management Information System (MMIS) to assume the full responsibilities of identifying, billing and paying all providers and recipients of Medicaid services, for a potential savings to taxpayers of about $10 million.

The second involves facilities management for "all the other categories," which will "give us computers to do a job that badly needs to be done," he said.

"Despite all the wailing and gnashing of teeth" by state residents, April 1977 marked the time when the state had the lowest fiscal debt in seven years, Dukakis said.

Part of the reason for this success is that Massachusetts has a lot of brainpower and technology, he explained. Massachusetts is the minicomputer capital of the world, he said, home base of Digital Equipment Corp., Wang Laboratories, Inc., Data General Corp. and other firms — companies which are expanding their facilities in the state.

Dukakis said he wants Massachusetts to continue its industrial expansion, especially the growth of technology.

But one of the problems the state may have to deal with in order to continue this expansion is a serious skill shortage in the computer industry, he said.

Most Promising Investment

SANTA MONICA, Calif. — Computer stores have been selected by *International Entrepreneur's Magazine* (IEM) in its annual survey as the small business opportunity showing the greatest investment potential for the coming year.

As an example of the potential, the first shop to be opened grossed more than $500,000 during the past year. Results of a national survey of home hobbyist computer usage predict a $50 million market this year and near $180 million by 1981.

Many of the shops in operation were started by either an electronics technician or a programmer. IEM classified the computer stores as a "medium-size investment" with initial cash requirements starting at around $10,000.

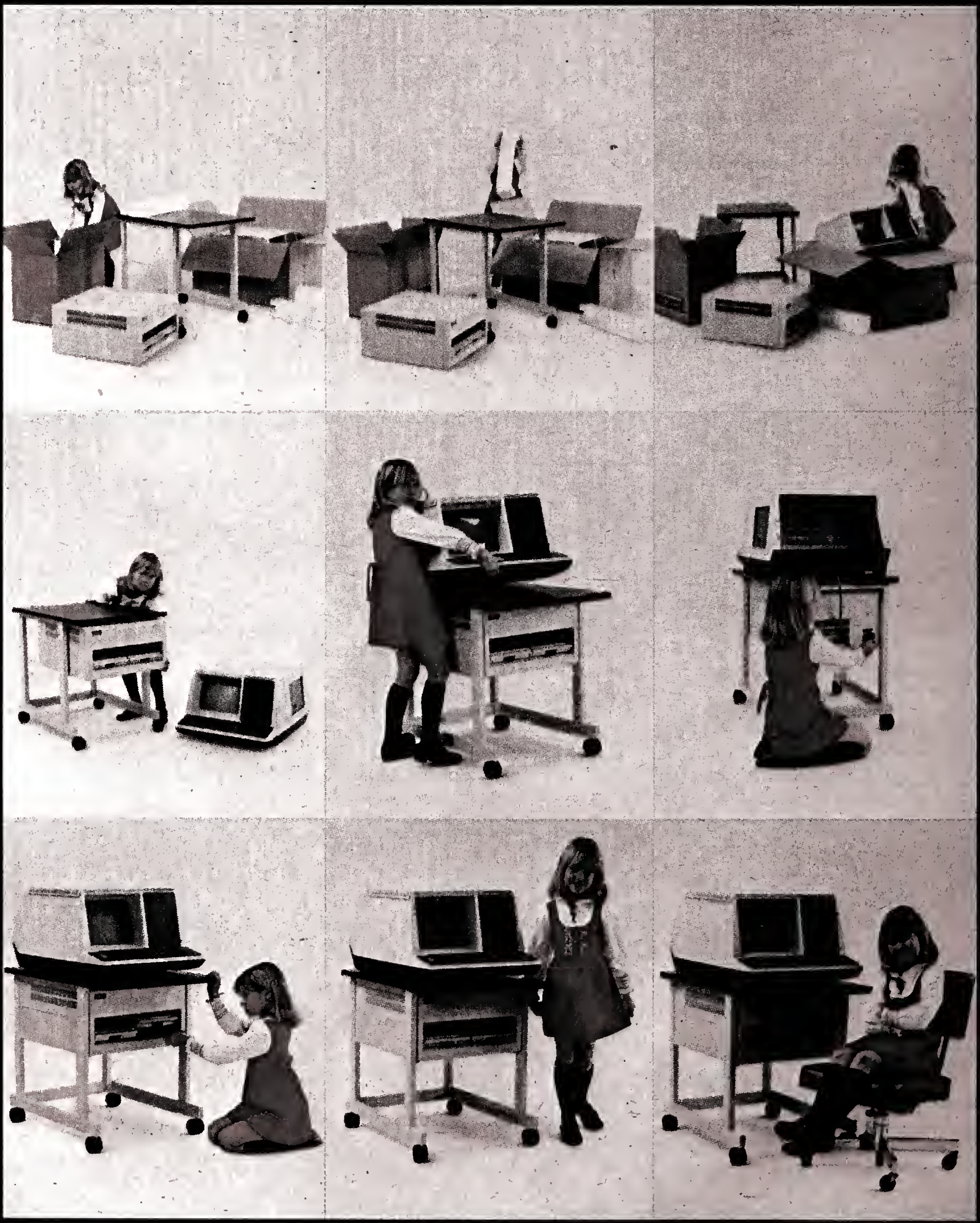
Details of the computer store research study are available from IEM at 631 Wilshire Blvd., Santa Monica, Calif. 90401.

'The Computer Store' To Sell DG Micronova

BURLINGTON, Mass. — The Computer Store, a retail personal computer outlet chain, will sell the entire Data General Corp. Micronova line of microcomputers.

"The Computer Store/Data General relationship establishes for the first time the entry of a major computer vendor into the personal computer market," according to Richard F. Brown, president of The Computer Store.

The products offered will include expansion memories and interfaces; RTOS, Basic, Fortran and development software; and the Dasher matrix printers, as well as the 6000 line of CRT terminals.



Manufacturers Seen Offering Lower Cost/Byte Drives

By Molly Upton
Of the CW Staff

DALLAS – A survey of disk drive makers exhibiting at the National Computer Conference here recently showed all recognize the increased demand that comes from a reliable device with a lower cost per byte.

However, although there are signs that vendors are increasing their offerings of varying technologies, there did not seem to be one preferred method.

Some indicated they expect wider use of drives combining fixed and removable media while some see more use of hybrid disks or those featuring both head/track and moving heads.

Disk drive capacity is increasing as a result of both improved technology, lower costs and users' growing appetites for storage.

CDC Offers Range

Control Data Corp., which makes disks from 29M- to 400M bytes, finds its most popular units are the 200M-byte drive and the 400M-byte unit, according to Ron Kamps, national sales manager for disk drives.

The 3380, CDC's 400M-byte unit that can also emulate IBM's 3350 with a 317.5M-byte capacity, offers a dual-access feature that allows two controllers to handle a string of drives. This feature gives redundancy, he explained.

The trend is for installations to combine 3380s with the 200M-byte units, thus giving the user both fixed and removable media, he said.

In the future, there will be more data modules as in the 3380, Kamps indicated, adding the firm spent about $8.6 million on this technology combining the disk and heads in one unit. The technology was first introduced in IBM's Winchester 3340 drive.

CDC's R&D and technical effort on disks is about $25 million a year, he added, indicating the firm intends to be competitive.

Memorex Corp. is not yet in volume production of its 3650 317.5M-byte unit, according to Steve Stone, product manager.

The biggest increase in demand has been for the firm's 3675, a 200M-byte drive, that comprises the bulk of Memorex's current disk volume, he said.

The product, with a nonremovable media, has a lower cost per M-byte than the rest of the line and the users tend to migrate to the lower cost, he said. For instance, the price is $1.60/M-byte/mo for 3650 and $4/M-byte/mo for the 3675, which is compatible with IBM's 3330-11.

Volume up 20%

The volume for the 3675 is up about 20% and the firm's disk business will probably grow more than 20% for the whole year, he said. "It depends on the number of 3650s we can get out," he added.

Memorex has a significant backlog, he noted, adding there are quite a few speculative orders, probably 20% to 30% of the backlog.

The original idea behind removable packs was transportability, but that has been overcome by telecommunications and the increased on-line use, he said. Now fixed media is more convenient, he added.

Memorex is not yet manufacturing its own version of the Winchester, the 3640, but rather sells units provided by Nippon Peripherals Ltd., Stone said.

Memorex is scheduled to ship two orders of the 3650 this month and be in volume production by September, he said.

Concerning the trend toward hybrid disks, Stone said initial expectations were optimistic. Whereas the firm had expected about 20% of the storage volume on 3640-type drives to be fixed-head, only about 5% is. Stone said he expects about 40% of the volume for 3650s to be fixed-head.

Advantage Offset

Stan Silverman, disk product manager for Diablo, while agreeing there is a trend toward nonremovable media which offers lower cost and higher reliability, said the advantages can be offset by the need to get data in and out.

In a small system this could be a floppy or a cassette in which case the result is a "wash" for small systems, he said.

Diablo has units with both fixed and removable media, he noted.

Calcomp Competitive

Calcomp's Bob Carter, district sales manager based in Dallas, said there is probably a trend toward fixed and removable media in one drive, however, Calcomp's are all removable. He added that Calcomp's are competitive on a cost basis.

Although there is talk about the mixing of head/track and moving heads, sales of fixed heads do not indicate the trend has arrived yet, he said.

Calcomp is now working on Winchester technology for future products whereas Diablo has indicated it is not considering converting to Winchester-type drives in the near future, he added.

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Contracts

Sanders Associates, Inc. has been awarded a $2,999,999 cost plus fixed fee contract by the Naval Electronic Systems Command to do research studies on an acoustic buoy.

General Electric's Information Services has received a $2.9 million computer services contract from the Air Force Contract Management Division of Air Force Systems Command, Kirtland Air Force Base, N.M.

Texas Instruments, Inc. and Mostek Corp. have been awarded contracts from the Hewlett-Packard Co. for semiconductor memory parts.

American Satellite Corp. has been awarded a five-year contract by the Department of Defense to install customer-dedicated earth stations and to provide satellite data communications between Barbers Point Naval Air Station in Oahu, Hawaii, and Moffett Naval Station in California.

Systems Engineering Laboratories has received a two-year OEM contract from TRW, Inc. for the delivery of SEL 32 computer systems.

Kennedy Co. has received a contract from Geometrics, Inc. for Kennedy's 9700 tape drives.

Relational Memory Systems, Inc. has received an OEM contract from Zilog for the Relms Z80 System Adapter Module.

Ocean Data Systems, Inc. has been awarded a $1,525,267 plus fixed fee contract by the Naval Electronic Systems Command for an analyst graphic console system which is used as a computer interface for Navy analysts using the Sea Watch system.

TRW, Inc. has been awarded a $1,057,720 modification to an existing cost plus award fee contract from the Naval Electronic Systems Command for oceanographic research.

International Business Machines Corp. of Manassas, Va., has received a $1,023,499 costs plus fixed fee contract from the Naval Sea Systems Command to prepare and develop a training program for the Trident Defense Weapon Subsystem/Command Subsystem.

Raytheon Service Co. has been awarded contracts from the University of California at Santa Barbara and Riverside for primary field maintenance service support of computer systems.

TDX Systems, Inc. has been awarded a contract by Manufacturers Hanover Trust Co., New York City, for the installation of its Telemax System, a computer-based service for managing and controlling telephone calls through long-distance networks.

Boeing Computer Services, Inc. has received a $1 million contract from the Nuclear Regulatory Commission to conduct a study leading to the development of the Integrated Safeguards Information System.

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Mini Makers See Bubbles, CCDs Coming

(Continued from Page 33)

to get to the point of bringing the system to the user, of being a "forgiving" system.

This, he said, means making all system operations transparent to the user. It is possible to accomplish this, but you pay for it in overhead — the system gets bigger, he noted.

Still, vendors are moving toward putting the understanding in the firmware and taking the burden away from the person at the terminal — at the same time assuring the user cannot affect the operating system, he said.

If vendors want to take advantage of bubbles or CCDs, the system architecture will have to be designed specifically to manage the various types of memory on the same system, Rivernider believes.

"MOS memory still has a way to go yet. We'll see larger semi memories before we begin using bubbles and CCDs," he predicted.

How is mainframe competition in the mini area seen at Prime? "I don't see IBM saying 'We're going to go out and get Prime by making the same machine." It uses the same TI catalog we do, but IBM can't just shut off its mainframe background and go our way.

"IBM will become a force in the mini market because minis will force their way into its market," he suggested. "It becomes a question of whether IBM is going after us or we're going after IBM."

Steven Egol, manager of market planning for the CMC Division of Pertec Computer Corp., doesn't see memory access or file management tasks being incorporated into firmware because there are simply too many applications to make it efficient.

He suggested, however, that firmware is a viable place for controllers when there is a standard way of dealing with the devices. CMC, he noted, has gone to a microprocessor which allows the microcode to be programmed, thereby reducing the cost of development and allowing redefinition of already defined software.

Egol sees the mainframers' entry into the mini arena as a welcome event because it encourages the growth of the distributed data processing concept and makes it easier for CMC to sell its product. CMC's approach is a turnkey one, rather than a general-purpose one, like IBM's.

Modular Computer Systems, Inc. has been following bubble and CCD activities closely and looking at them as products it will have in 1980 or 1981, according to Edward Marinaro, director of corporate planning.

"We don't have enough knowledge yet to know which technology will give us advantages over the other, but I can see one of them replacing some of the current mass storage devices like disk," he stated.

Modcomp is actively pursuing the memory hierarchy approach and has had a fair amount of success with its "Memory +" product, a bulk core memory I/O system which offers up to four million bytes of directly accessible memory in 256K-byte increments.

A First Step

Like bubbles and CCDs, it is faster than disk or drum storage, but slower than main memory, Marinaro said. It also represents a first step toward that hierarchy about which the industry is talking.

Modcomp welcomes the mainframer competition. "In effect, IBM has chosen to compete on the minicomputer manufacturers' terms instead of on its own terms.

"IBM doesn't offer the quantity discount others offer, but it has priced the product at the level most shipments go out, so it has a competitive price," he said.

The reasonable approach is not to try to be all things to all people, but to earn a market share in one area isolated from IBM, Marinaro said, noting Modcomp has recently reorganized.

Rather than addressing the general small business market, it will concentrate on measurement and control, telecommunications, OEMs and small business turnkey systems, he explained.

Terminal Makers Act to Retain Profits

(Continued from Page 33)

both the Higher Level Data Link Control and X.25 protocols [CW, April 4].

For its part, Courier has altered its lease prices and slightly adjusted the purchase prices. Courier's approach is to trade "term for rate," Douglas said, explaining the firm's five-year leases will be competitive with IBM's offerings.

For instance, the Courier lease will initially save a user 30% over the current line of IBM terminal gear and then 20% over the new products, he said.

Courier has promised to add features announced by IBM, such as increased screen capacity.

Only a slight adjustment on purchase prices was necessary to maintain the 40% difference between Courier's prices and IBM's, he said. Courier's prices are about 12% to 20% below IBM's Extended Term Plan and 40% below on purchase, so the firm "has pretty much adjusted prices to maintain parity," he said.

Under Advisement

Harris Corp.'s Data Communications Division is studying the situation, according to Robert Jewett, controller of the Nashua, N.H. operation, which includes Sanders.

Genesis One, which makes terminals but not controllers, is also assessing the IBM announcement "and will react accordingly," according to Daniel Kail, marketing vice-president.

Kail does not feel not having a controller is a disadvantage. "People are still going to need terminals," he said.

Although Genesis One won't know how difficult it is to interface with the 3274 until IBM publishes the specs, the firm has been successful with previous models, he stated.

"We view the announcement as encouraging, since it indicates a long life for the 3270. We will adjust our prices to remain competitive," he added.

The pricing adjustment by IBM was not a complete surprise, but none of the independents indicated they expected the magnitude of price changes announced by IBM.

"Most companies build into their pricing strategy some price erosion," Hitt noted. "It's just a question of when you exercise the price erosion.

"We've anticipated a price change on IBM's part for a year and a half. It's going to affect us, but it's not going to affect us that much."

Courier is not overly concerned about the lower prices because it has been reducing its costs in hopes of enjoying improved margins, Douglas explained. However, IBM accelerated the timetable, he commented.

Courier's profit margins after the price cuts will be about the same, he said.

"We're responding to IBM aggressively from a pricing standpoint. We'll be able to maintain our margins at a reasonable rate because we've been working on getting our costs down," he stated.

IBM has served notice that "if you're going to compete in this marketplace, you're going to have to have a very low price. I think there's going to be a number of people that will choose not to compete because of it," Douglas said.

"IBM's price is probably down fairly close to some people's cost, and they're going to opt to pass this time around. It wouldn't surprise me if AT&T passed, for two reasons.

"One, the cost is more aggressive than it would have ever expected, and the hint of intelligence in the controllers has kind of got AT&T over a barrel since it is somewhat precluded from doing processing of data in a terminal environment."

Others that have establised particular niches, such as data entry, might well concentrate on those areas rather than pursue IBM head-on to protect their margins, he continued.

Dan Printz, marketing manager at Teletype Corp., said that firm has no plans to lower prices on its Dataspeed 40/4. However, he explained, AT&T, not Teletype, provides the unit on a lease basis; Teletype handles sales only.

IBM's Latest Prices

As an example of IBM's latest prices and products, a 3278 terminal leases for $49- and $63/mo for the 960- and 3,440-character versions, respectively, under IBM's two-year plan.

The 3278 would probably link to either the 3276, which is a display with an integrated controller, that leases for $142- to $154/mo or a 3274 controller that handles up to 32 terminals and leases for $293- to $417/mo, an IBM spokesman said.

Before the price cuts and announcements, IBM had no two-year lease plan for the older 3270 line, and a 3277 cost $84/mo on a standard rental plan. The 3277 with 480 characters now rents for $71/mo or, under the new two-year lease, $60/mo, he said.

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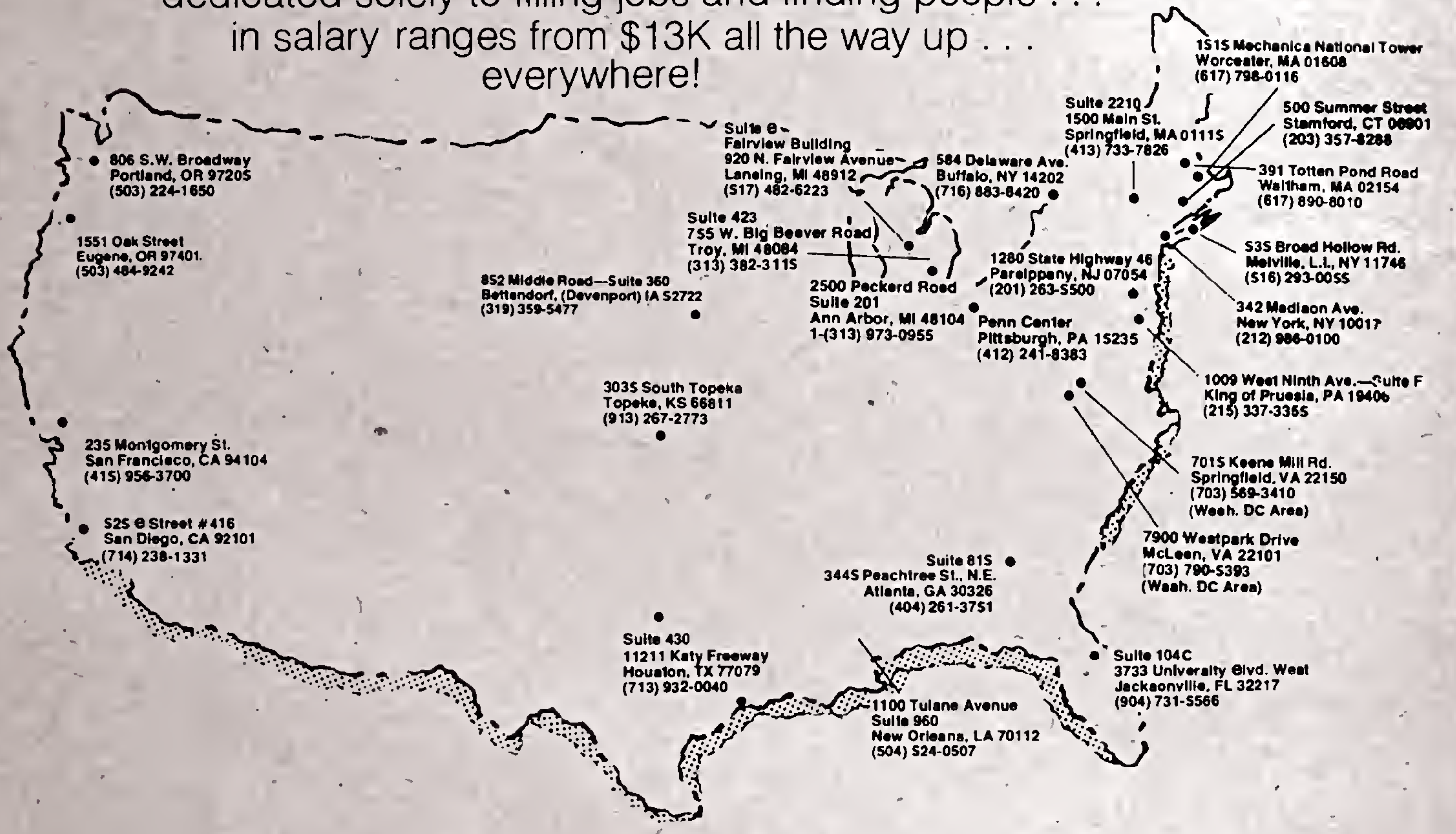

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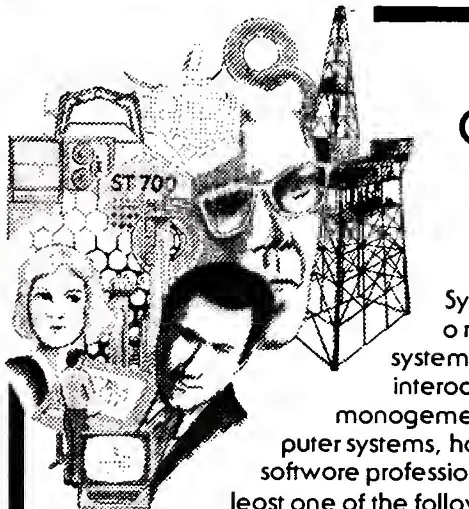

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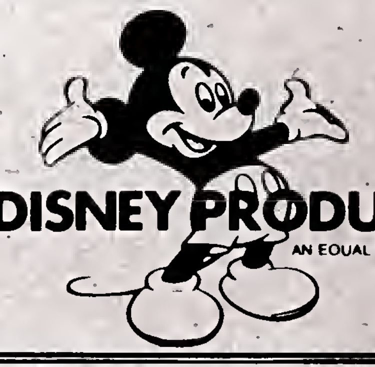

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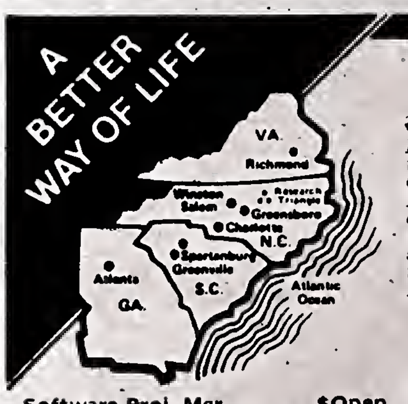

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- Real-time scientific applications
- Network management
- Computer-to-computer communications
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MEMORY

SYSTEMS

intel

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Major expansion of the DP department of this leader in specialized insurance has created a new position. IBM 370/148 is being installed and DL/1, IMS and CICS will be considered. If you have any database experience and want a challenge, here it is! $28,000

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Hit a dead end?

Feel the world is passing you by? CTG has several openings for persons with demonstrated management ability. Whether you're in an IBM DOS or OS shop, NCR, Honeywell, Univac or any other; we would like to talk to you. At CTG you won't be the forgotten individual who achieved career goals early and now has nowhere to go. Join a company that is 100% data processing. Upgrade your skills while you display your talents by directing others. CTG provides professional environment with no limit on growth. Opportunities in management, project leadership, sales, minicomputers. Positions available in Baltimore, Buffalo, Chicago, Pittsburgh, Rochester.

Call (301) 288-5980 or send resume to:

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LIFE-COMM is written in ALC and will be running under MVS, IMS on a 370/168. TSO will be utilized for installation.

In the application area, two years of ALC are required. Life insurance experience would be helpful but is not a requirement.

The software support position requires:

- **3-5 years ALC experience**
- **Macro, OS-JCL debugging experience**
- **Teleprocessing experience**

We are located in Battle Creek, Michigan where golf courses and tennis courts abound, along with clear lakes for fishing, sailing and other recreational activities. If you're interested in relocating to this vacation wonderland and also joining a challenging technical environment send your resume, including salary history to: K.C. Brown, Federal Life and Casualty Company, 78 West Michigan Avenue, Battle Creek, Mich. 49016.

Equal Opportunity Employer

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PROGRAMMING PROJECT LEADER
SYSTEMS ANALYSTS
SENIOR PROGRAMMERS
SYSTEMS PROGRAMMERS

If you have experience in the development or programming of retail systems, or a strong financial systems or programming background, this is the opportunity to join a successful organization on the move.

Excellent compensation and a complete benefits package are offered. All positions are located in suburban Central New England within easy driving distance to the mountains, the seashore or Boston.

If you are interested in further details or desire an immediate interview, please contact:

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DATA PROCESSING PLACEMENT
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Client companies assume all fees, interview and relocation expenses.

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1515 Mechanics Nat'l. Tower
Worcester, Mass. 01608

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Southeastern United States

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- Minimum of five years experience in systems and programming with primary concentration in manufacturing-oriented systems.
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These positions include excellent salaries and an attractive benefits package. To apply, send your resume including current compensation in confidence to:

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University of Missouri is a 4 campus institution located throughout Missouri. Please send resume to:

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If you are looking for the opportunity to exercise your analytical and leadership capabilities towards real achievement, please investigate this position with Digital by sending your resume to Carol Reed, Digital Equipment Corporation, 200 Forest Street, Marlboro, Mass. 01752.

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We are seeking creative, dynamic individuals who have experience in the planning, design, implementation and marketing support of timesharing software emphasizing problem solving.

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-- Financial Planning, Modeling, and Reporting
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-- Econometrics
-- Industry Applications

Provide input and specifications for sales literature, manuals, training aids, and education programs.

- Assist field marketing offices by providing headquarters support for existing products.
- Assist the sales force as required in marketing activities by participating in selected sales calls as an expert advisor.

The Requirements

- B.A. or B.S. (Master's degree desirable)
- At least 2 years relevant experience either with a commercial timesharing vendor or utilizing timesharing with a major corporation.
- Good working knowledge of at least one timesharing language.
- Experience with data base management systems, APL, or COBOL very desirable.
- PDP-10 experience would be helpful but is not required.

Salary, etc.

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CompuServe
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Columbus, Ohio 43220
EOE M/F

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Tulane University
School of Engineering
New Orleans, LA 70118

Assistant Professorship effective January 2, 1978. Applicants should have a doctoral degree and a strong interest in teaching undergraduate courses in programming languages, assembly language, systems programming, operating systems and other advanced software topics. Familiarity with PDP-11 desirable. Send resume and three references to:

Dr. Victor J. Law
Chairman, Computing Science Div.
Dept. of Electrical Engineering
School of Engineering
Tulane University
New Orleans, LA 70118

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DATA PROCESSING

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PROGRAMMER ANALYSTS

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Qualified candidates should possess a BSEE, BSCS, BS in Math, or related degree plus three or more years in real-time assembly language programming. Additional experience with distributed intelligence systems design or a background on the Motorola 6800 is a valuable plus. Especially talented individuals with seven or more years experience in these areas would be considered as candidates for positions as Senior Programmer Analysts.

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DATA PROCESSING

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SYSTEMS PROGRAMMERS

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Experience with DECsystem-10 is preferred. Bachelor's degree is desirable. Salary negotiable.

Successful candidate will assist in conversion from PDP KA10 to PDP KL10B running with the TOPS-10 Monitor and in the subsequent software maintenance of the KL10B.

If interested send resume by July 8, 1977 (and if possible about 250 lines of your Assembly Language code at least one year old) to:

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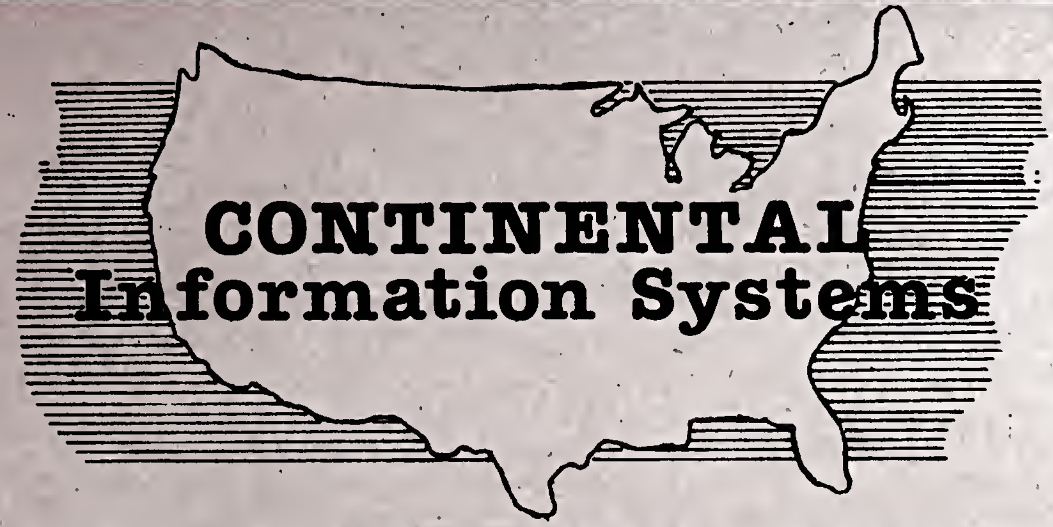

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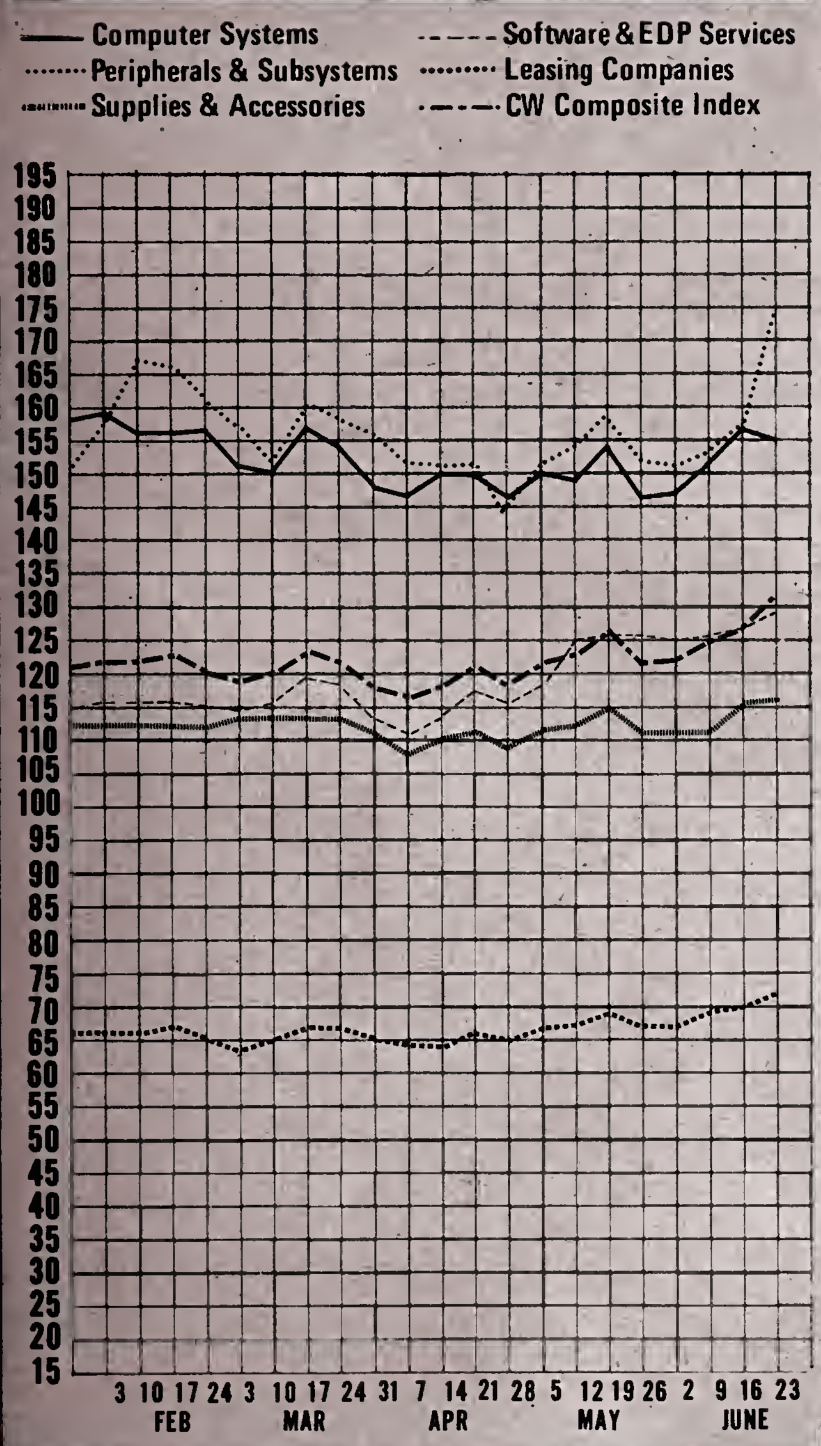
COMPUTERWORLD Computer Stocks Trading Indexes



Earnings Reports

PERTEC COMPUTER
Year Ended March 25

	e1977	1976
Shr Ernd	$.89	$1.09
3 Mo Shr	.28	.27
Revenue	94,520,000	50,178,000
Earnings	4,691,000	3,441,000
Revenue	25,135,000	11,131,000
Earnings	1,495,000	858,000

e-Includes Computer Machinery Corp. and Icom, Inc. results, acquired in March and September 1976 respectively.

PRIME COMPUTER
Three Months Ended April 3

	1977	1976
Shr Ernd	$.30	$.16
Revenue	9,313,000	3,957,000
Tax Cred	150,000	.....
Earnings	732,000	365,000

QUANTOR
Three Months Ended April 30

	1977	1976
Shr Ernd	$.15	$.11
Revenue	5,948,000	4,388,000
Tax Cred	163,000	133,000
Earnings	346,000	277,000
9 Mo Shr	.43	.23
Revenue	18,293,000	11,837,000
Tax Cred	486,000	276,000
Earnings	1,033,000	604,000

TRANSDUCER SYSTEMS
Year Ended December 31

	1976	1975
Shr Ernd	$.10	.....
Revenue	1,039,000	$739,000
Earnings	53,000	(166,000)

WANG LABORATORIES
Three Months Ended March 31

	1977	1976
Shr Ernd	$.35	e$.21
Revenue	32,036,000	22,947,000
Earnings	1,803,000	1,102,000
9 Mo Shr	.95	e.64
Revenue	88,268,000	65,195,000
Earnings	4,875,000	3,263,000

e-Adjusted to reflect shares issued in connection with Class B common stock dividend declared on April 9, 1976.

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 22, 1977

All statistics compiled,
computed and formatted by
TRADE★QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE			
		1977 RANGE (1)	CLOSE JUN 22 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	0- 39	23 3/4	+ 3/4	+3.2
N	BURROUGHS CORP	55- 91	59 3/8	-1 1/4	-2.0
O	COMPUTER AUTOMATION	18- 28	25 3/4	-2	-7.2
N	CONTROL DATA CORP	20- 26	21 3/8	- 3/8	-1.7
N	DATA GENERAL CORP	35- 46	43 3/8	+ 1/2	+1.1
N	DATAPOINT CORP	18- 30	25 3/8	- 3/8	-1.4
N	DIGITAL EQUIPMENT	37- 53	46 3/8	+1 3/8	+3.0
N	ELECTRONIC ASSOC.	2- 3	1 3/4	- 1/8	-6.6
A	ELECTRONIC ENGINEER.	8- 10	8 7/8	+ 5/8	+7.5
O	FOUR-PHASE SYSTEMS	13- 17	15 1/8	+ 5/8	+4.3
N	FOXBORO	42- 54	51 1/8	0	0.0
O	GENERAL AUTOMATION	6- 9	6 7/8	+ 7/8	+14.5
O	GRI COMPUTER CORP	1- 1	5/8	- 1/8	-16.6
N	HEWLETT-PACKARD CO	69- 87	77	-2 7/8	-3.5
N	HONEYWELL INC	44- 55	54 1/8	+1 3/4	+3.3
N	IBM	245-286	260 3/8	+1 5/8	+0.6
O	MANAGEMENT ASSIST	5- 9	5 3/8	+ 1/8	+2.3
O	MEMOREX	23- 29	22 1/2	-1	-4.2
O	MICRODATA CORP	7- 18	9 1/4	- 3/4	-7.5
O	MODULAR COMPUTER SYS	5- 8	7 3/8	- 5/8	-7.8
N	NCR	32- 38	36 1/2	+ 1/8	+0.3
O	PRIME COMPUTER INC	12- 17	15 1/2	- 5/8	-3.8
N	PERKIN-ELMER	17- 21	19 7/8	+1 1/4	+6.7
N	RAYTHEON CO	55- 66	62 3/4	-2 3/4	-4.1
N	SPERRY RAND	34- 42	36 1/2	- 1/8	-0.3
O	SYCOR INC	8- 15	8 3/8	+ 3/8	+4.6
A	SYSTEMS ENG. LABS	5- 7	6 1/4	+ 1/8	+2.0
N	VARIAN ASSOCIATES	15- 21	21	+ 1/2	+2.4
A	WANG LABS.	14- 18	15 3/8	+ 1/2	+3.3

LEASING COMPANIES

EXCH		PRICE			
		1977 RANGE (1)	CLOSE JUN 22 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE COURIER CORP	8- 10	8-3/4	+ 1/8	+1.4
O	COMDISCO INC	10- 13	9 3/4	0	0.0
A	COMMERCE GROUP CORP	2- 2	2	- 3/8	-15.7
A	COMPUTER INVSTRS GRP	1- 2	7/8	+	+7.1
M	DATRONIC RENTAL	1- 2	1	0	0.0
A	DCL INC	1- 2	1 3/4	0	0.0
N	DPF INC	6- 8	7 5/8	+ 3/8	+5.1
N	ITEL	13- 18	17 5/8	+ 3/4	+4.4
N	LEASCO CORP	19- 24	21	+ 3/8	+1.8
O	LEASPAC CORP	1- 2	1 1/2	+ 7/8	+140.0
O	NRG INC	0- 0	1/8	0	0.0
A	PIONEER TEX CORP	6- 11	5 3/4	- 3/8	-6.1
N	U.S. LEASING	10- 14	13 7/8	+ 1/2	+3.7

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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SOFTWARE & EDP SERVICES

EXCH		PRICE			
		1977 RANGE (1)	CLOSE JUN 22 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1 3/8	0	0.0
O	ANACOMP INC	7- 9	8 3/8	- 1/8	-1.4
A	APPLIED DATA RES.	5- 9	9	+ 1/8	+1.4
N	AUTOMATIC DATA PROC	23- 30	28	- 3/4	-2.6
O	COLEMAN AMERICAN COS	2- 2	1 7/8	0	0.0
O	COMPU-SERV NETWORK	10- 15	12	- 1/2	-4.0
O	COMP ELECTION SYSTMS	6- 9	8 3/4	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 7	6	+ 1/4	+4.3
N	COMPUTER SCIENCES	7- 9	7 5/8	+ 1/8	+1.6
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	2- 3	1 3/4	+ 1/8	+7.6
O	COMSHARE	5- 7	4 3/4	- 1/4	-5.0
O	DATA DIMENSIONS INC	4- 5	3 3/4	0	0.0
O	DATATAB	1- 2	2	0	0.0
N	ELECTRONIC DATA SYS.	16- 20	19 3/8	+1	+5.4
O	INSYTE CORP	2- 3	1 5/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/2	0	0.0
O	KEANE ASSOCIATES	3- 4	4	0	0.0
O	KEYDATA CORP	2- 3	2	0	0.0
A	LOGICON	7- 17	17 1/8	+ 7/8	+5.3
A	MANAGEMENT DATA	1- 2	1 1/8	- 1/8	-10.0
A	NATIONAL CSS INC	19- 25	19 5/8	- 1/8	-0.6
O	NATIONAL DATA CORP	4- 7	5 3/8	+ 1/2	+10.2
A	ON LINE SYSTEMS INC	17- 22	19	+2 1/4	+13.4
N	PLANNING RESEARCH	3- 5	4 1/8	+ 1/4	+6.4
O	PROGRAMMING & SYS	1- 1	5/8	+ 1/8	+25.0
O	RAPIDATA INC	2- 3	2 1/4	0	0.0
O	REYNOLDS & REYNOLD	17- 20	18	0	0.0
O	SCIENTIFIC COMPUTERS	1- 3	3 1/8	0	0.0
O	TYMSHARE INC	14- 20	17 1/2	0	0.0
A	URS SYSTEMS	4- 5	4 3/4	+ 1/8	+2.7
N	WYLY CORP	1- 2	1 3/8	0	0.0

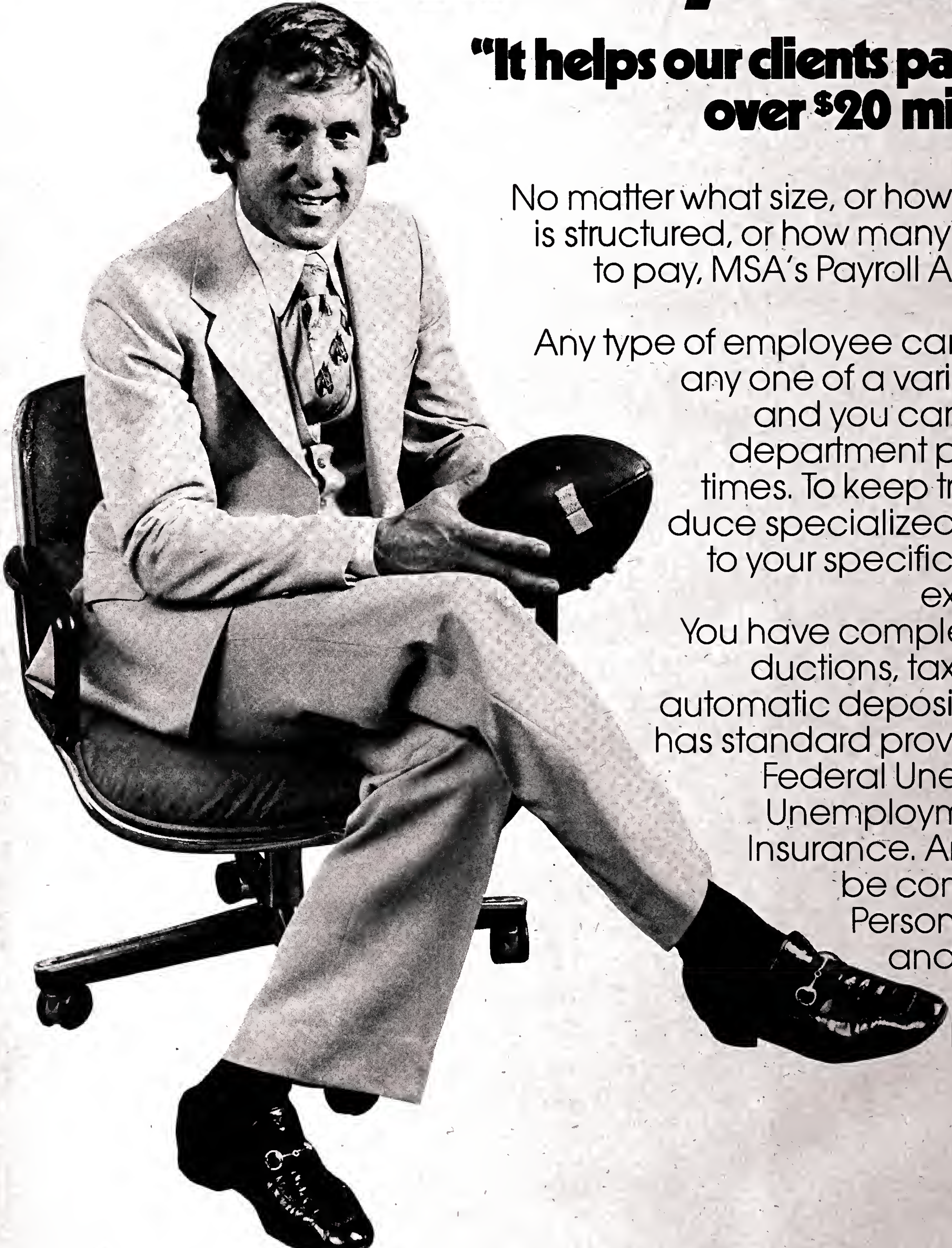
PERIPHERALS & SUBSYSTEMS

EXCH		PRICE			
		1977 RANGE (1)	CLOSE JUN 22 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 14	13 1/4	+ 5/8	+4.9
O	ADVANCED MEMORY SYS	7- 9	7 1/2	0	0.0
N	AMPEX CORP	8- 9	9	- 1/8	-1.3
O	ANDERSON JACOBSON	3- 4	3 3/8	+ 1/8	+3.8
N	APPLIED DIG DATA SYS	10- 16	14 1/8	- 5/8	-4.2
O	BEEHIVE INT'L	8- 12	8 1/2	0	0.0
A	BOLT,BERANEK & NEW	7- 8	6 5/8	0	0.0
N	BUNKER-RAMO	8- 12	9 3/8	- 1/2	-5.0
A	CALCOMP	3- 5	3	+ 1/4	+9.0
O	CAMBRIDGE MEMORIES	1- 3	2	-	-2.9
N	CENTRONICS DATA COMP	22- 29	27 7/8	- 1/8	-0.4
O	COGNITRONICS	1- 1	5/8	0	0.0
O	COMPUTER COMMUN.	5- 6	5 1/2	- 3/8	-6.3
O	COMPUTER CONSOLES	4- 7	6	- 1/4	-4.0
A	COMPUTER EQUIPMENT	2- 3	3 1/4	+ 1/8	+4.0
O	COMPUTER TRANSCEIVER	1- 1	1	- 1/8	-11.1
O	COMTEN	9- 13	11 1/2	+2	+21.0
N	CONRAC CORP	19- 28	25 1/4	+1	+4.1
O	DATA ACCESS SYSTEMS	4- 5	4 1/4	0	0.0
O	DATA 100	6- 8	7 3/8	+1 1/8	+18.0
A	DATA PRODUCTS CORP	9- 13	11 7/8	0	0.0
O	DATA TECHNOLOGY	3- 4	4	+ 1/4	+6.6
O	DATUM INC	1- 2	1 1/2	0	0.0
O	DECISION DATA COMPUT	2- 2	2 1/4	+ 1/2	+28.5
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
N	ELECTRONIC M & M	4- 5	4 1/4	+ 3/8	+9.6
O	FABRI-TEK	1- 2	1 1/4	+	+5.2
O	GENERAL COMPUTER SYS	0- 2	1 1/4	- 1/4	-16.6
N	HAZELTINE CORP	9- 12	9 5/8	0	0.0
N	HARRIS CORP	28- 39	37 1/2	+ 1/4	+0.6
A	INCOTERM CORP	11- 15	12 1/8	- 5/8	-4.9
O	INFOREX INC	4- 7	4 3/8	- 1/8	-2.7
O	INFORMATION INTL INC	9- 14	9 1/4	-1 1/4	-11.9
O	INTEL CORP	38- 57	46	0	0.0
A	LUNDY ELECTRONICS	3- 6	4 1/8	0	0.0
O	MSI DATA CORP	6- 9	9	+1 1/2	+20.0
N	MOHAWK DATA SCI	5- 8	5 1/4	- 1/8	-2.3
O	PENRIL CORP	2- 5	4 1/4	0	0.0
A	PERTEC CORP	7- 9	7 1/2	+ 7/8	+13.2
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	4 1/8	+ 1/2	+13.7
O	RECOGNITION EQUIP	6- 10	8 5/8	+1 1/4	+16.9
O	SCAN DATA	1- 2	1 3/4	+ 1/8	+7.6
O	STORAGE TECHNOLOGY	10- 15	14	+1 1/4	+9.8
O	T BAR INC	7- 11	10 5/8	+ 3/8	+3.6
O	TALLY CORP.	4- 6	4 3/8	+ 1/4	+6.0
O	TEC INC	7- 10	8 5/8	+ 3/8	+4.5
N	TEKTRONIX INC	29- 36	35 1/2	+ 1/4	+0.7
N	TELEX	2- 3	3	+ 1/2	+20.0
O	WILTEK INC	1- 1	1/2	+ 1/8	+33.3

SUPPLIES & ACCESSORIES

EXCH		PRICE			
		1977 RANGE (1)	CLOSE JUN 22 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	2- 4	1 5/8	- 1/8	-7.1
A	BARRY WRIGHT	10- 14	14	+1 1/2	+12.0
O	CYBERMATICS INC	1- 1	5/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 18	17 3/8	+ 7/8	+5.3
N	ENNIS BUS. FORMS	6- 7	6 1/8	0	0.0
O	GRAHAM MAGNETICS	11- 14	14	0	0.0
O	GRAPHIC CONTROLS	15- 18	16 1/2	- 1/4	-1.4
N	3M COMPANY	48- 56	50	+1 5/8	+3.3
O	MOORE CORP LTD	29- 37	28 3/4	+ 1/4	+0.8
N	NASHUA CORP	16- 22	20 3/8	- 3/8	-1.8
O	STANDARD REGISTER	18- 25	24 1/2	+1 1/2	+6.5
O	TAB PRODUCTS CO	13- 17	16 1/4	- 1/2	-2.9
N	UARCO	19- 22	20	0	0.0
A	WABASH MAGNETICS	10- 15	14 3/8	- 1/4	-1.7
N	WALLACE BUS FORMS	17- 21	17 1/4	0	0.0

"Check the Scouting Report on MSA's Payroll System."



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